• No part of this manual may be reproduced in any form.
• All specifications and designs are subject to change without notice.

The export of this product is subject to the authorization of the government of the country from where the product is exported.

In this manual we have tried as much as possible to describe all the various matters. However, we cannot describe all the matters which must not be done, or which cannot be done, because there are so many possibilities. Therefore, matters which are not especially described as possible in this manual should be regarded as "impossible".

This manual contains the program names or device names of other companies, some of which are registered trademarks of respective owners. However, these names are not followed by ® or ™ in the main body.
SAFETY PRECAUTIONS

This section describes the safety precautions related to the use of CNC units, to ensure safe operation of machines fitted with FANUC CNC units. Read this section carefully before attempting to use any function described in this manual. Users should also read the relevant descriptions in the User’s Manual of the CNC to become fully familiar with the functions to be used.

Contents

DEFINITION OF WARNING, CAUTION, AND NOTE ..................s-2
GENERAL WARNINGS AND CAUTIONS..................................s-3
DEFINITION OF WARNING, CAUTION, AND NOTE

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warnings and Cautions according to their bearing on safety. Also, supplementary information is described as Notes. Read the Warnings, Cautions, and Notes thoroughly before attempting to use the machine.

⚠️ WARNING
Applied when there is a danger of the user being injured or when there is a danger of both the user being injured and the equipment being damaged if the approved procedure is not observed.

⚠️ CAUTION
Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE
The Note is used to indicate supplementary information other than Warning and Caution.

- Read this manual carefully, and store it in a safe place.
GENERAL WARNINGS AND CAUTIONS

⚠️ WARNING

1. Before operating the machine, thoroughly check the entered data. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

2. Never attempt to machine a workpiece without first checking the programmed value, compensation value, current position, and external signal settings. Also, never attempt to machine a workpiece without first checking the operation of the machine. Before starting a production run, ensure that the machine is operating correctly by performing a trial run using, for example, the single block, feedrate override, or machine lock function, or by operating the machine with neither a tool nor workpiece mounted. Failure to confirm the correct operation of the machine may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

3. Ensure that the specified feedrate is appropriate for the intended operation. Generally, for each machine, there is a maximum allowable feedrate. The appropriate feedrate varies with the intended operation. Refer to the manual provided with the machine to determine the maximum allowable feedrate. If a machine is run at other than the correct speed, it may behave unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

4. When using a tool compensation function, thoroughly check the direction and amount of compensation. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

5. The parameters for the CNC and PMC are factory-set. Usually, there is no need to change them. When, however, there is no alternative other than to change a parameter, ensure that you fully Failure to set a parameter correctly may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.
CAUTION
1 Immediately after switching on the power, do not touch any of the keys on the MDI panel until the position display or alarm screen appears on the CNC unit. Some of the keys on the MDI panel are dedicated to maintenance or other special operations. Pressing any of these keys may place the CNC unit in other than its normal state. Starting the machine in this state may cause it to behave unexpectedly.

2 The operator's manual for FAST Ethernet / FAST Data Server describes all the basic functions of the CNC, including the optional functions. The selected optional functions vary with the machine. Some functions described in this manual may not, therefore, be supported by your machine. Check the machine specifications before using FAST Ethernet / FAST Data Server.

3 Some machine operations and screen functions are implemented by the machine tool builder. For an explanation of their usage and related notes, refer to the manual provided by the machine tool builder.

   For example:
   • On some machines, executing a tool function causes the tool change unit to operate. When executing a tool function on such a machine, stand well clear of the tool change unit. Otherwise, there is a danger of injury to the operator.
   • Many auxiliary functions trigger physical operations, such as rotation of the spindle. Before attempting to use an auxiliary function, therefore, ensure that you are fully aware of the operation to be triggered by that function.

NOTE
Command programs, parameters, and variables are stored in nonvolatile memory in the CNC. Generally, the contents of memory are not lost by a power on/off operation. However, the contents of memory may be erased by mistake, or important data in nonvolatile memory may have to be erased upon recovering from a failure.

To enable the restoration of data as soon as possible if such a situation arises, always make a backup of the data in advance.
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- General Warnings and Cautions

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   - 1.3 Related Manuals

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   - 2.1 Data Server File Management
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This part explains the organization of this manual.
1.1 ORGANIZATION

This manual consists of the following parts:

**SAFETY PRECAUTIONS**
This section describes the precautions to be observed when reading this manual.

**I. GENERAL**
This part describes the chapter organization, applicable models, and related manuals.

**II. SPECIFICATION**
This part describes the specifications of the functions that operate on the FAST Ethernet/FAST Data Server.

**III. SETTING**
This part describes the method of setting.

**IV. OPERATION**
This part describes the method of operating the Data Server functions and machine remote diagnosis functions.

**V. CONNECTION**
This part describes the method of connection and provides notes.

**VI. MAINTENANCE**
This part provides an Ethernet board drawing number and describes the meanings of LED indications.

**APPENDIX**
These appendixes describe additional information such as that related to troubleshooting, the operation of the FTP client, and how to set up the FTP server.
1.2 APPLICABLE MODELS

This Operator's Manual covers the following models. The abbreviations in the following table are sometimes used in text descriptions.

<table>
<thead>
<tr>
<th>Model name</th>
<th>Abbreviation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FANUC Series 30i-MODEL A</td>
<td>Series 30i-A</td>
<td>30i-A</td>
</tr>
<tr>
<td>FANUC Series 300i-MODEL A</td>
<td>Series 300i-A</td>
<td>300i-A</td>
</tr>
<tr>
<td>FANUC Series 300i/-MODEL A</td>
<td>Series 300i-A</td>
<td>300i-A</td>
</tr>
<tr>
<td>FANUC Series 300i/s-MODEL A</td>
<td>Series 300i/s-A</td>
<td>300i/s-A</td>
</tr>
<tr>
<td>FANUC Series 31i-MODEL A</td>
<td>Series 31i-A</td>
<td>31i-A</td>
</tr>
<tr>
<td>FANUC Series 31i/-MODEL A5</td>
<td>Series 31i-A</td>
<td>31i-A</td>
</tr>
<tr>
<td>FANUC Series 310i-MODEL A</td>
<td>Series 310i-A</td>
<td>310i-A</td>
</tr>
<tr>
<td>FANUC Series 310i/-MODEL A5</td>
<td>Series 310i-A</td>
<td>310i-A</td>
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<tr>
<td>FANUC Series 310i/s-MODEL A</td>
<td>Series 310i/s-A</td>
<td>310i/s-A</td>
</tr>
<tr>
<td>FANUC Series 310i/s-MODEL A5</td>
<td>Series 310i/s-A</td>
<td>310i/s-A</td>
</tr>
<tr>
<td>FANUC Series 32i-MODEL A</td>
<td>Series 32i-A</td>
<td>32i-A</td>
</tr>
<tr>
<td>FANUC Series 320i-MODEL A</td>
<td>Series 320i-A</td>
<td>320i-A</td>
</tr>
<tr>
<td>FANUC Series 320i/s-MODEL A</td>
<td>Series 320i/s-A</td>
<td>320i/s-A</td>
</tr>
</tbody>
</table>
1.3 RELATED MANUALS

The table below lists manuals related to this Operator's Manual. Refer to these manuals when you use this Operator's Manual.

Related manuals of FANUC Series 30i/300i/300is, 31i/310i/310is, 32i/320i/320is -A

<table>
<thead>
<tr>
<th>Manual name</th>
<th>Specification number</th>
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</thead>
<tbody>
<tr>
<td>DESCRIPTIONS</td>
<td>B-63942EN</td>
</tr>
<tr>
<td>CONNECTION MANUAL (HARDWARE)</td>
<td>B-63943EN</td>
</tr>
<tr>
<td>CONNECTION MANUAL (FUNCTION)</td>
<td>B-63943EN-1</td>
</tr>
<tr>
<td>USER'S MANUAL (Common to Lathe System/Machining Center System)</td>
<td>B-63944EN</td>
</tr>
<tr>
<td>USER'S MANUAL (For Lathe System)</td>
<td>B-63944EN-1</td>
</tr>
<tr>
<td>USER'S MANUAL (For Machining Center System)</td>
<td>B-63944EN-2</td>
</tr>
<tr>
<td>MAINTENANCE MANUAL</td>
<td>B-63945EN</td>
</tr>
<tr>
<td>PARAMETER MANUAL</td>
<td>B-63950EN</td>
</tr>
</tbody>
</table>

Related manuals of FANUC CIMPLICITY i CELL

<table>
<thead>
<tr>
<th>Manual name</th>
<th>Specification number</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATOR'S MANUAL</td>
<td>B-75074EN</td>
</tr>
</tbody>
</table>

Related manuals of FANUC Machine Remote Diagnosis Package

<table>
<thead>
<tr>
<th>Manual name</th>
<th>Specification number</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATOR'S MANUAL</td>
<td>B-63734EN</td>
</tr>
</tbody>
</table>
II. SPECIFICATION
1. PREFACE

In this manual, a board that has an ATA Flash card or a Compact Flash Card (collectively called a memory card hereinafter) mounted to enable the use of the Data Server functions is referred to as a "FAST Data Server" (or simply as a "Data Server"). On the other hand, a board that does not have a memory card mounted is referred to as a "FAST Ethernet".

<table>
<thead>
<tr>
<th>Board name</th>
<th>Usable function</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAST Data Server</td>
<td>- Data Server functions</td>
</tr>
<tr>
<td>(or simply referred to as &quot;Data Server&quot;)</td>
<td>- FOCAS2/Ethernet functions</td>
</tr>
<tr>
<td></td>
<td>- CNC screen display functions</td>
</tr>
<tr>
<td></td>
<td>- Machine remote diagnosis functions</td>
</tr>
<tr>
<td>FAST Ethernet</td>
<td>- FOCAS2/Ethernet functions</td>
</tr>
<tr>
<td></td>
<td>- CNC screen display functions</td>
</tr>
<tr>
<td></td>
<td>- Machine remote diagnosis functions</td>
</tr>
</tbody>
</table>

**NOTE**

To use the Data Server functions, the Data Server function option is required.
To use the FOCAS2/Ethernet functions, CNC screen display functions, and machine remote diagnosis functions, the Ethernet function option is required.
To use the CNC screen display functions, the CNC screen display function option is additionally required.
The Data Server functions use a memory card built into a board for storing files and can transfer files and perform DNC operation using FTP.

A Data Server can operate on both FTP client and FTP server. When you use a Data Server to transfer files, the Data Server operates as an FTP client and communicates with the FTP server on the host computer. When you use the host computer to transfer files, the Data Server operates as an FTP server and communicates with the FTP client on the host computer.

**NOTE**

When the host computer operates as an FTP server, FTP server software must be run on the host computer. When the host computer operates as an FTP client, FTP client software must be run on the host computer.
2.1 DATA SERVER FILE MANAGEMENT

With the Data Server functions, you can format the built-in memory card in the CNC file management mode to manage NC programs.

CNC file management

For NC programs managed in the CNC file management mode, memory operation such as custom macro commands and M98-based subprogram calling are available. Operate the NC programs using the PROGRAM FOLDER screen in the same way as for NC programs in the CNC memory. As a CNC external input/output device, DNC operation and M198-based subprogram calling are available. In this case, operate NC programs using the DATA SERVER FILE LIST screen.

NOTE
1 The Data Server for the 30i-A allows editing and memory operation of NC programs stored on the memory card, so the method of managing files on the memory card differs from the file management method of conventional Data Servers. Note that, therefore, the memory card of the 30i-A is not compatible with the memory cards of conventional Data Server models.
2 For operation and details of the PROGRAM FOLDER screen, refer to Chapter 11, "PROGRAM MANAGEMENT," in Part III, "OPERATION," in the "USER'S MANUAL (Common to Lathe System/Machining Center System) (B-63944EN)."
3 For operation and details of the DATA SERVER FILE LIST screen, refer to Chapter 1, "OPERATING THE DATA SERVER FUNCTIONS," in Part IV, "OPERATION."
2.1.1 File Names of CNC File Management

You can assign a file name to a file managed in the CNC file management mode in the same way as for CNC memory.

- Up to 32 characters
- Alphabetic characters (in upper and lower cases), numeric characters, and four symbols (+, -, _, and .)

**NOTE**

1. File names are case-sensitive.
2. Any file name or folder name cannot begin with a period (.).
3. It is impossible to assign the same name to a file and a folder.

<table>
<thead>
<tr>
<th>File names and program numbers</th>
</tr>
</thead>
</table>

When a file name assigned to a file consists of uppercase O and a numeric value, the file name is treated as a program number. Values ranging from 1 to 9999 can be used. A value beyond this range cannot be used for a file name in the program number format.

Example)

<table>
<thead>
<tr>
<th>File names that can be used as program numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>“O0123” Program number 123</td>
</tr>
<tr>
<td>“O0001” Program number 1</td>
</tr>
<tr>
<td>“O3000” Program number 3000</td>
</tr>
<tr>
<td>“O9999” Program number 9999</td>
</tr>
</tbody>
</table>

File names that cannot be used as program numbers

| “ABC” (Does not have the format "O plus a numeric value") |
| “o123” (Does not begin with uppercase letter "O") |
| “O123.4” (Uses a character other than numeric characters) |

**NOTE**

When files on a Data Server are managed by program number, their program numbers always consist of "O" plus a 4-digit number. So, even if there are files managed with different file names such as "O1" and "O01" on a personal computer, their program numbers are regarded as the same when these files are transferred to the Data Server.
### 2.1.2 Files which can be Created on a Data Server

In the initial status, the maximum number of files which can be created on a memory card on a Data Server is 2047 and the maximum file size is 512 MB. Each folder is counted as one file.

The maximum number of files and the maximum file size can be changed using NC parameter No. 930.

For details, see Section 2.2, "RELATED NC PARAMETERS," in Part III, "SETTING."

### 2.1.3 Text Files and Binary Files

You can store the following two types of files on a memory card on a Data Server: text files and binary files.

For a text file, memory operation and edit operation as well as DNC operation can be performed by selecting it as a main program.

For binary files, only DNC operation is available, but binary input operation in the high-speed remote buffer A format is available.

If NC data other than an NC program is not handled as a binary file, it may not be able to be input or output correctly. NC data punched and stored on a memory card on a Data Server from the CNC is automatically handled as a binary file. A file to be transferred from a personal computer to a memory card on a Data Server must be specified explicitly as a binary file.

More specifically, for GET operation on a Data Server operation screen, you can use soft key [GET] or [BGET] to specify whether to handle the file as a text file or a binary file.

When the Data Server is used as an FTP server, you can execute an ASCII (text file) command or a BIN (binary file) command on your personal computer (FTP client) to specify whether to handle the file as a text file or a binary file.

#### NOTE

An NC program stored as a text file is converted to an editable file format so that the file can be edited on the CNC. For this reason, when a text file is read from the host computer to the memory card on the Data Server, then the file is transferred to the host computer, binary compatibility can no longer be maintained.
2.2 DATA SERVER MODES

Each Data Server mode determines the input or output destination when a Data Server is operated as a CNC external input/output device. You can select one of the following three modes.

NOTE
Data Server modes are valid only when the Data Server is operated as an external storage device of the CNC. In case of main program operation for editing and a memory operation and an M98-based subprogram call, programs on the memory card of the Data Server are selected regardless of the Data Server mode.

Storage mode

The memory card built into the Data Server is selected as the external input/output device.

For example, when DNC operation or M198-based subprogram calling is executed, the relevant NC program is called from the memory card built into the Data Server.

When input operation (read) is executed for the Data Server, the relevant NC program is read from the memory card built into the Data Server.

Conversely, when NC program output operation (punch) is executed for the Data Server, the output NC program is written on the memory card built into the Data Server.

FTP mode

The host computer connected to the Data Server is selected as the external input/output device.

For example, when DNC operation or M198-based subprogram calling is executed, the relevant NC program is called from the host computer.

When input operation (read) is executed for the Data Server, the relevant NC program is read from the host computer connected to the Data Server.

Conversely, when NC program output operation (punch) is executed for the Data Server, the output NC program is directly written on the host computer.
CAUTION
1 In the FTP mode, an NC program is transferred from the host computer to the CNC. For this reason, if the line is disconnected during communication for some reason such as noise on the network, the disconnection directly affects the CNC operation as compared with the storage mode. Before DNC operation in the FTP mode, surely take measures to prevent noise and make sure that good communication conditions are present.
2 When feed hold is performed during DNC operation in the FTP mode, communication with the host computer may be stopped. In this case, the host computer may disconnect the communication. Perform feed hold during a trial run and completely confirm that the communication with the host computer is not disconnected.

Buffer mode

The host computer connected to the Data Server is selected as the external input device.
In the buffer mode unlike the FTP mode, however, areas on the memory card built into the Data Server are used as intermediate buffers. For details of the buffer mode, see Section 2.3, "DETAILS OF THE BUFFER MODE," which is the following section.
As the external output device, the memory card built into the Data Server is selected. When NC program output operation (punch) is performed, the operation equivalent to that in the storage mode is performed.

NOTE
With the 32i-A, the buffer mode cannot be used.
2.3 DETAILS OF THE BUFFER MODE

In the buffer mode, two areas (areas A and B) are prepared on the memory card. While the NC program data stored in one area is being supplied to the CNC, the subsequent NC program data is read in the other area from the host computer using FTP transfer. When all data in the former area has been supplied to the CNC, the data in the latter area is supplied to the CNC. In the former area, which becomes empty, the subsequent NC program data is read from the host computer using FTP transfer.

Repeating this operation enables an NC program larger than the capacity of the memory card to be handled. To use the buffer mode, however, the original NC program must be divided into some files on the host computer in advance.

The size of a divided file must be smaller than half the remaining capacity of the memory card. If the size of a divided file is too large (for example, 100 MB or more), it takes much time to read the first file from the host computer and it also takes time until operation starts.

Using the buffer mode

In the buffer mode, a file (such as Oxxxx) called by DNC operation or M198-based subprogram calling is a file list. The file list contains the names of files to be called in the order in which they are to be called. In the buffer mode, the Data Server sequentially calls the files specified in the file list from the host computer and supplies data to the CNC.
Files (file1 to file5) specified in the file list on the host computer are stored on the memory card built into the Data Server using FTP transfer and supplied to the CNC. In the buffer mode, after the CNC issues a request to read an NC program to the Data Server, the specified file list is read from the host computer. When the first file has been read, the Data Server starts supplying data to the CNC. For this reason, it takes time from when the CNC issues a request to read a program to when the Data Server starts supplying data.

While the Data Server is supplying the data in one area to the CNC, it stores data into the other area using FTP transfer. For this reason, divide the original program data so that two consecutive files can be contained on the memory card built into the Data Server.

Although the data in one area has been supplied to the CNC, FTP transfer may not terminate for the other area. In this case, program calling terminates abnormally because the subsequent data cannot be supplied. You can use a parameter not to cause the abnormal termination.

In the file list, you can specify any file name allowed by the host computer that consists of up to 255 single-byte alphanumeric characters. Be sure to specify at least one LF (0A in hexadecimal) or CR (0D in hexadecimal) following each file name in the file list to delimit the file names.

**NOTE**

In the buffer mode, you can also register a new file on the memory card built into the Data Server by the "NC program GET" or "NC program output" operation.

By this operation, however, the remaining capacity of the memory card built into the Data Server that is required for operation in the buffer mode may be exhausted, resulting in an error in DNC operation in the buffer mode.

For this reason, during DNC operation in the buffer mode, do not register any new file on the memory card built into the Data Server.
Dividing an NC program into files

To perform operation in the buffer mode, divide an original NC program into several files on the host computer and create a file list indicating the order in which the divided files are to be transferred in advance.

Example)
Dividing an NC program into three files

As shown above, divide an original NC file into three files, file1, file2, and file3. Specify the divided file names in the file list (file name: O1234).
CAUTION

In the above example, the NC program is divided into files so that any block is not divided. You can divide a program at a point in a block. When dividing a program at a point in a block, be careful so that any unnecessary character is not inserted at the end of each file.
If an unnecessary character is inserted at the end of a file, the NC program may perform unexpected operation when executed. Be very careful when preparing and editing an NC program on the host computer.

NOTE
1. Divide an NC program into files so that each file size is about 20 to 30 MB. If the file size is too large, it takes time until DNC operation starts. If the file size is too small, data transmission may stop between files and operation may stop.
2. Although you can divide an NC program at a point in a block, divide the program in block units whenever possible and retract the tool at the end of each divided file. This prevents data transmission from stopping at the end of a file and cutter marking from being made.
3. Store the file list and relevant divided files in the same directory on the same host computer.
2.4  OPERATION FROM A DATA SERVER

Memory operation

You can perform memory operation for an NC program on the memory card built into a Data Server in the same way as for an NC program in the CNC memory. You can also supply an NC program simultaneously for a multipath CNC system.

NOTE
When memory operation is performed, a selected program on the Data Server must be a text file. It is impossible to use a binary file for memory operation.

M198 subprogram operation

In the storage mode, you can perform M198 calling from the memory card built into a Data Server. In the FTP or buffer mode, you can perform M198 calling form the host computer.
On the DATA SERVER FILE LIST screen, set an M198 folder in advance. When M198 calling is specified, the set M198 folder is searched for the target subprogram.

NOTE
The file name of an NC program called by M198 must have the O number format.

DNC operation

In the storage mode, you can perform DNC operation from the memory card built into a Data Server. In the FTP or buffer mode, you can perform DNC operation from the host computer.
On the DATA SERVER FILE LIST screen, set the file name for DNC operation in advance. When DNC operation starts, the set DNC operation file is called.
2.5 NC PROGRAM FORMAT

NC programs prepared on the host computer must have the following format:

```plaintext
% TITLE ;
O0001(COMMENT) ;
.
.
.
M30 ;
%
```

An NC program starts with a start file mark (%). In the subsequent part (leader section) until EOB (;, program start) is encountered, a comment such as a title can be inserted as necessary.

At the beginning of the program section, be sure to specify an O number or specify a file name consisting of up to 32 characters enclosed by "<" and ">". This O number or file name must be used for management on the personal computer.

If an O number or a file name in an NC program is different from a file name on the personal computer, the file name used on the personal computer takes priority by default when the file is transferred from the personal computer to the Data Server.

The semicolon ";" used at the end of each block means EOB (end of block) and actually functions as LF (LF: 0A in hexadecimal), CR-LF (CR: 0D in hexadecimal), or LF-CR-CR.

The NC program must end with "M code ; %".

When performing binary input operation, insert data for binary input operation, enclosed with the start code and end code of binary input operation, into the part ". . . " in the above figure.

For details of binary input operation, refer to the relevant operator's manual of the CNC.

⚠️ WARNING

If an NC program prepared on the host computer does not use the program format specified by the CNC, executing the NC program can cause an unpredictable operation. So, special care should be taken when an NC program is prepared on the host computer.
2.6 LIST FILE FORMAT

In the LIST-GET, LIST-PUT, and LIST-DELETE functions described later, one of the following list file formats must be used:

Format 1

```plaintext
% ;
00001 (COMMENT) ;
N111 ;
N222 ;
N333 ;
: ;
N999 ;
%
```

Format 2

```plaintext
% ;
00001 (COMMENT) ;
N111 (PC-File) ;
N222 (PC-File) ;
N333 (PC-File) ; 
: ;
N999 (PC-File) ;
%
```

Format 3

```plaintext
% ;
00001 (COMMENT) ;
(Dtsvr-File) ;
(Dtsvr-File) ;
(Dtsvr-File) ; 
: ;
(Dtsvr-File) ;
%
```

Format 4

```plaintext
% ;
00001 (COMMENT) ;
(Dtsvr-File, PC-File) ;
(Dtsvr-File, PC-File) ;
(Dtsvr-File, PC-File) ; 
: ;
(Dtsvr-File, PC-File) ;
%```
Specifications common to all formats

<1> A list file begins with a start file mark "%".
<2> In the next block, be sure to specify an O number. Assign this O number as the file name.
     A comment enclosed in parentheses "( " and ")" can be inserted between the O number and EOB.
<3> In the subsequent blocks, specify files to be processed.
<4> The list file must end with "%".

Specifications of format 1

The following describes the specifications of list file format 1:
<1> This specification method applies when the file names of files to be processed have the format "Oxxxx" (where "xxxx" denotes a 4-digit number). In this case, change "O" in file name "Oxxxx" to "N" when specifying the file name. The 4-digit number can be zero-suppressed. The example shows that files O0111, O0222, O0333, and so on up to O0999 are processed sequentially.
<2> The LIST-GET service transfers "Oxxxx" files stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server without modifying file names "Oxxxx". The LIST-PUT service transfers "Oxxxx" files stored on the built-in memory card of the FAST Data Server to the built-in hard disk of the host computer without modifying file names "Oxxxx". The LIST-DELETE service deletes "Oxxxx" files stored on the built-in memory card of the FAST Data Server.

Specifications of format 2

The following describes the specifications of list file format 2:
<1> This specification method applies when files to be processed are named "Oxxxx" (where "xxxx" denotes a 4-digit number) on the built-in memory card of the FAST Data Server and are named arbitrary file names on the built-in hard disk of the host computer. In this case, change "O" in file name "Oxxxx" to "N" when specifying the file name on the FAST Data Server. The 4-digit number can be zero-suppressed. The example shows that files O0111, O0222, O0333, and so on up to O0999 are processed sequentially.
   A file name on the built-in hard disk of the host computer can be specified by enclosing it with parentheses "(" and ")" following the corresponding "Nxxxx". The characters that can be used in file names depend on the OS of the host computer.
<2> The LIST-GET service transfers files with arbitrary file names "PC-File" stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server as "Oxxxx" files. The LIST-PUT service transfers "Oxxxx" files stored on the built-in memory card of the FAST Data Server to the built-in hard disk of the host computer as files with arbitrary file names "PC-File". The LIST-DELETE service deletes "Oxxxx" files stored on the built-in memory card of the FAST Data Server.
Specifications of format 3

The following describes the specifications of list file format 3:

<1> This specification method applies when the file names of files to be processed are arbitrary file names. In this case, file names on the built-in memory card of the FAST Data Server and on the built-in hard disk of the host computer are assumed to be the same. Specify an arbitrary file name enclosed with parentheses "(" and ")". The characters that can be used in arbitrary file names are the following 66 ASCII characters only:
- Numeric characters 0 to 9
- Lowercase letters a to z
- Uppercase letters A to Z
- Four symbols (+, -, _, .)

<2> The LIST-GET service transfers files with arbitrary file names "Dtsvr-File" stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server with the file names kept unchanged.
The LIST-PUT service transfers "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server to the built-in hard disk of the host computer with the file names "Dtsvr-File" kept unchanged. The LIST-DELETE service deletes "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server.

Specifications of format 4

The following describes the specifications of list file format 4:

<1> This specification method applies when files to be processed have arbitrary file names. In this case, file names on the built-in memory card of the FAST Data Server and file names on the built-in hard disk of the host computer are assumed to be different. Specify a file name on the built-in memory card of the FAST Data Server and a file name on the built-in hard disk of the host computer in parentheses, separated by a comma ",". The characters that can be used in file names on the built-in memory card of the FAST Data Server are the following 66 ASCII characters only:
- Numeric characters 0 to 9
- Lowercase letters a to z
- Uppercase letters A to Z
- Four symbols (+, -, _, .)

The characters that can be used in arbitrary file names on the built-in hard disk of the host computer depend on the OS of the host computer.

<2> The LIST-GET service transfers files with arbitrary file names "PC-File" stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server as "Dtsvr-File" files.
The LIST-PUT service transfers "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server to files with file name "PC-File" on the built-in hard disk of the host computer.
The LIST-DELETE service deletes "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server.
Limitations on file names in a list file

The following limitations apply when file names are specified in a list file:

<1> The characters that can be used in file names on the built-in memory card of the FAST Data Server are the following 66 ASCII characters only:
- Numeric characters 0 to 9
- Lowercase letters a to z
- Uppercase letters A to Z
- Four symbols (+, -, _, .)

The characters that can be used in arbitrary file names on the built-in hard disk of the host computer depend on the OS of the host computer.

<2> Arbitrary file names may consist of up to 255 characters. However, the number of characters that can actually be used depends on the OS of the host computer.

Storage locations of list files

The LIST-GET, LIST-PUT, and LIST-DELETE services are useful functions for managing NC programs in groups.

The places where list files are prepared vary depending on the service to be executed.

For the LIST-GET service, NC programs to be operated on are present on the built-in hard disk of the host computer, so list files are placed also on the built-in hard disk of the host computer.

For the LIST-PUT and LIST-DELETE services, NC programs to be operated on are present on the built-in memory card of the FAST Data Server, so list files are also prepared on the built-in memory card of the FAST Data Server.
The FOCAS2/Ethernet functions can remotely control and monitor the CNC by using a personal computer. For details, refer to the manual delivered with the FOCAS2 library software.

NOTE
In the FOCAS2/Ethernet functions, the CNC operates as a server and waits for a communication start request from a personal computer that operates as a client. As communication with the personal computer starts, two sockets are used for control and monitoring from the personal computer and for file transfer.
4 ABOUT DNS/DHCP

If DNS/DHCP is used for communication setting of the Data Server functions and FOCAS2/Ethernet functions, Ethernet addresses (IP address and subnet mask) can be set at a time on the host computer to facilitate Ethernet address control.

DNS

With the DNS function, a fully qualified domain name (e.g., www.fanuc.co.jp) can be specified instead of a hard-to-remember IP address just consisting of numbers (e.g., 192.168.0.10) when a TCP/IP communication destination is to be specified.

NOTE
To use the DNS function, a personal computer having the DNS server function is additionally required. See Chapter 4, "SETTING THE DNS/DHCP FUNCTION," in Part III, "SETTING," and APPENDIX C, "EXAMPLE OF SETTING UP DNS/DHCP."

DHCP

With the DHCP function, Ethernet addresses (IP address and subnet mask) that need to be set on the CNC can be set on the host computer.

NOTE
To use the DHCP function, a personal computer having the DHCP server function is additionally required. See Chapter 4, "SETTING THE DNS/DHCP FUNCTION," in Part III, "SETTING," and Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."
With the machine remote diagnosis functions, checking of the internal CNC status, ladder program editing, and other operations can be performed as necessary by using a personal computer through a LAN. For details, refer to “MACHINE REMOTE DIAGNOSIS OPERATOR’S MANUAL (B-63734EN).”
III. SETTING
1 SETTING THE COMMUNICATION FUNCTION

This part describes the settings required to operate the following FAST Ethernet/FAST Data Server functions:

- Data Server functions
- FOCAS2/Ethernet functions
- CNC screen display functions
- Machine remote diagnosis functions

Notes on using the Data Server functions

⚠️ CAUTION

When setting the FAST Ethernet/FAST Data Server for the first time, carefully set data such as an IP address and conduct a sufficient communication test, consulting with your network administrator. If data such as an IP address is not set correctly, a communication failure can affect the entire network. Take sufficient care.
This chapter describes the communication setting for the Data Server functions.

Notes on using the functions for the first time

⚠️ CAUTION
1. When using the FAST Data Server for the first time, be sure to initialize the memory card, set parameters, then turn the power off then back on. If an attempt is made to use the Data Server functions without following these steps, normal operation is not guaranteed.
2. Before performing FTP communication using the FAST Data Server for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network. In particular, IP address duplication causes an intermittent communication failure in the Data Server, which can result in a system error in the CNC. So, be very careful when making settings.
3. When the power to the CNC is turned off during access to the memory card, files stored on the memory card may be destroyed. So, be careful not to turn off the power to the CNC during access to the memory card.
4. In preparation for damage to the memory card, always take backup copies of the files stored on the memory card to the host computer.

NOTE
1. With the Data Server functions (FTP client), a single CNC can connect only one FTP server.
2. With the Data Server functions (FTP server), a single CNC can connect up to five FTP clients. However, some FTP client software programs may each internally use two or more FTP clients. Note, therefore, that the number of FTP clients is not always equal to the number of applications.
3. The Data Server functions do not support passive mode (PASV command).
2.1 OPERATING THE DATA SERVER SETTING SCREEN

This section describes the setting screen for operating the Data Server functions.

Procedure

1. Press the function key \[\text{system}\].
2. Soft key [ETHER BOARD] appear. (When there is no soft keys, press the continue key.)
3. Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4. Press soft keys [COMMON] and [DATA SERVER] and then enter parameters for the items that appear.
### COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

![COMMON screen (BASIC)](image)

#### Setting item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP ADDRESS</td>
<td>Specify the IP address of the FAST Data Server. (Example of specification format: &quot;192.168.0.100&quot;)</td>
</tr>
<tr>
<td>SUBNET MASK</td>
<td>Specify a mask address for the IP addresses of the network. (Example of specification format: &quot;255.255.255.0&quot;)</td>
</tr>
<tr>
<td>ROUTER IP ADDRESS</td>
<td>Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: &quot;192.168.0.253&quot;)</td>
</tr>
</tbody>
</table>

#### Display item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC ADDRESS</td>
<td>FAST Data Server MAC address</td>
</tr>
</tbody>
</table>

### NOTE

The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see "SETTING THE DNS/DHCP FUNCTION" provided later.
Data Server screens (CONNECT 1, CONNECT 2, CONNECT 3)

Press soft key [DATA SERVER] to display the Data Server screen. By using page keys [PAGE][PAGE], the three host computers at connection destinations 1, 2, and 3 can be set.

### Data Server screens (for connection destination 1)

**Setting item**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOST NAME</td>
<td>Specify the IP address of the host computer. (Example of specification format: &quot;192.168.0.200&quot;)</td>
</tr>
<tr>
<td>PORT NUMBER</td>
<td>Specify the port number. Usually, set 21 because the FTP communication is used.</td>
</tr>
<tr>
<td>USER NAME</td>
<td>Specify the name of the user to log on to the host computer using FTP. (A user name of up to 31 characters can be specified.)</td>
</tr>
<tr>
<td>PASSWORD</td>
<td>Specify the password for the above user name. The password must always be specified.</td>
</tr>
<tr>
<td>LOGIN FOLDER</td>
<td>Specify a work folder to be used when the user logs in to the host computer. (Up to 127 characters can be specified.) If no data is set, the home folder set on the host computer is used as a login folder.</td>
</tr>
</tbody>
</table>
Operation

Select a connection destination.

1. Press soft key [(OPRT)] to display soft key [HOST SELECT]. Then, press soft key [HOST SELECT] to display soft keys [CONECT 1], [CONECT 2], and [CONECT 3].

2. Press one of soft keys [CONECT 1], [CONECT 2], and [CONECT 3] according to the host computer to which you want to make a connection. The screen title of connection destination 1, 2 or 3 is displayed in reverse video. The screen title displayed in reverse video indicates the connection destination host computer.

When connection destination 1 is selected
Data Server screens (FTP SERVER)

Press soft key [DATA SERVER] to display the Data Server screen. By using page keys PAGE PAGE PAGE PAGE, the FTP server setting screen is displayed after the connection destination 1, 2, or 3 screen.

### Setting item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USER NAME</td>
<td>Specify a user name to be used when the host computer logs in to the Data Server. (A user name of up to 31 characters can be specified.)</td>
</tr>
<tr>
<td>PASSWORD</td>
<td>Specify the password for the above user name. The password must always be specified.</td>
</tr>
<tr>
<td>LOGIN FOLDER</td>
<td>Specify a work folder to be used when the host computer logs in to the Data Server. (Up to 127 characters can be specified.) If no data is set, the home folder (home directory) is used as a login folder.</td>
</tr>
</tbody>
</table>
Data Server MODE screen (SETTING)

Press soft key [DS MODE] to display the Data Server MODE screen (SETTING). The current mode can be checked and changed.

### Display item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNELS</td>
<td>Displays the number of channels currently being used.</td>
</tr>
<tr>
<td>MODE</td>
<td>Displays the currently set Data Server mode.</td>
</tr>
<tr>
<td></td>
<td>STORAGE MODE</td>
</tr>
<tr>
<td></td>
<td>FTP MODE</td>
</tr>
<tr>
<td></td>
<td>BUFFER MODE</td>
</tr>
</tbody>
</table>

### Operation

The Data Server mode can be changed.

1. Press soft key [(OPRT)] to display soft keys [STORAGE MODE], [FTP MODE], and [BUFFER MODE].

2. To change the mode to a desired mode, press the soft key of the desired mode.

### NOTE

To use the buffer mode, the software option for buffer mode functions is required.
Press soft key [DS MODE] and press page keys to display maintenance information for each channel.

**Display item**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNEL</td>
<td>Interface number of the buffer used for transferring NC programs between the CNC and Data Server. For example, a channel is assigned to each path.</td>
</tr>
<tr>
<td>EMPTY COUNTER</td>
<td>Used for maintenance. This item indicates the number of cases where the buffer becomes empty while NC programs are being transferred from the Data Server to the CNC.</td>
</tr>
<tr>
<td>TOTAL SIZE</td>
<td>Used for maintenance. This item indicates the total number of bytes transferred when an NC program is transferred from the Data Server.</td>
</tr>
<tr>
<td>WRITE POINTER</td>
<td>Used for maintenance. This item indicates the buffer use status when NC programs are transferred from the Data Server to the CNC.</td>
</tr>
<tr>
<td>READ POINTER</td>
<td></td>
</tr>
</tbody>
</table>
Data Server FORMAT screen

Press soft key [DS FORMAT] to display the format screen of the memory card built into the Data Server.

<table>
<thead>
<tr>
<th>Display item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVICE NAME</td>
<td>Indicates the storage media currently being used by the Data Server.</td>
</tr>
<tr>
<td></td>
<td>&quot;ATA&quot; or &quot;NONE&quot; is indicated.</td>
</tr>
<tr>
<td>FORMAT TYPE</td>
<td>Indicates the format type of the memory card.</td>
</tr>
<tr>
<td></td>
<td>&quot;CNC FILE&quot; or &quot;---&quot; is displayed.</td>
</tr>
<tr>
<td></td>
<td>When &quot;---&quot; is displayed, check whether the memory card is mounted properly</td>
</tr>
<tr>
<td></td>
<td>and is formatted correctly.</td>
</tr>
<tr>
<td>CHECK DISK</td>
<td>Indicates the check result.</td>
</tr>
<tr>
<td></td>
<td>When no check is made : &quot;-----&quot;</td>
</tr>
<tr>
<td></td>
<td>When the check result is normal : &quot;OK&quot;</td>
</tr>
<tr>
<td></td>
<td>When the check result is abnormal : &quot;NG&quot;</td>
</tr>
</tbody>
</table>
Procedure (CHECK DISK)

1. Press soft key [(OPRT)] then soft key [CHECK DISK].

2. Press soft key [EXEC] to check the format of the memory card and display the check result.

⚠️ CAUTION
If the check result is abnormal, determine the cause of trouble from an error message displayed on the ETHERNET LOG screen and back up the files stored on the memory card immediately. Then, try to reformat the memory card.

NOTE
1. An error occurs if other Data Server functions are operated when a check disk is made.
2. Also when a program on the memory card of the Data Server is selected as a main program, the check disk operation cannot be performed.

Procedure (CNC FORMAT)

1. Press soft key [(OPRT)] then soft key [CNC FORMAT].

2. Press soft key [EXEC] to format the memory card built into the FAST Data Server.

⚠️ CAUTION
1. Do not turn off the power to the CNC when the memory card is being formatted. Otherwise, the memory card can be damaged.
2. When the memory card is formatted, all files held on the memory card are erased.

NOTE
1. An error occurs if other Data Server functions are operated when the memory card is formatted.
2. Also when a program on the memory card of the Data Server is selected as a main program, the memory card cannot be formatted.
2.2 RELATED NC PARAMETERS

The NC parameters related to the Data Server functions are described below.

<table>
<thead>
<tr>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TVC</td>
</tr>
</tbody>
</table>

[Data type] Bit

TVC When a file is transferred from the personal computer to the Data Server, a TV check is:
0: Not performed.
1: Performed.

NOTE
This parameter is valid only for text files.
For text files, see Subsection 2.1.3, "Text Files and Binary Files" in Part II, "SPECIFICATION."

<table>
<thead>
<tr>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CRF</td>
</tr>
</tbody>
</table>

[Data type] Bit

CRF When a file is output from the Data Server to the personal computer, EOB (end of block) is:
0: Set as specified by parameter NCR (bit 3 of parameter No. 100).
1: Set to "CR" "LF".

NCR When a file is output from the Data Server to the personal computer, EOB (end of block) is:
0: Set to "LF" "CR" "CR".
1: Set to "LF".

NOTE
This parameter is valid only for text files.
For text files, see Subsection 2.1.3, "Text Files and Binary Files" in Part II, "SPECIFICATION."
## 2. SETTING THE DATA SERVER FUNCTIONS

### 0904  LCHK

<table>
<thead>
<tr>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCHK</td>
<td>Bit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the LIST-GET service of the Data Server, when a list file specifies 1025 or more files:
- 0: A check for duplicated file names is performed.
- 1: A check for duplicated file names is not performed.

**BWAT**

If FTP communication is behind data supply during DNC operation in the buffer mode of the Data Server:
- 0: An error is caused.
- 1: No error is caused and DNC operation continues after waiting the completion of FTP communication.

### 0905  DSFN

<table>
<thead>
<tr>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSFN</td>
<td>Bit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When a program is stored on the memory card of the Data Server:
- 0: The file name takes priority.
- 1: The program name in the NC program takes priority.

**PCHK**

At the start of communication of the Data Server or machine remote diagnosis functions, checking for the presence of the server using PING is:
- 0: Performed.
- 1: Not performed.

### NOTE

Usually, set Performed (0).

When the presence of the server is not checked using PING (this parameter is set to 1), it may take several tens of seconds until an error (absence of the server in the network) can be recognized.

For mainly security reasons, a personal computer may be set so that it does not respond to the PING command. To communicate with such a personal computer, set Not performed (1).

### 0921  Selects the host computer 1 OS.

<table>
<thead>
<tr>
<th>[Data type]</th>
<th>Byte</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Valid data range]</td>
<td>0 to 2</td>
</tr>
<tr>
<td>0: Windows 95/98/Me/2000/XP.</td>
<td></td>
</tr>
<tr>
<td>1: UNIX/VMS.</td>
<td></td>
</tr>
<tr>
<td>2: Linux.</td>
<td></td>
</tr>
</tbody>
</table>

### 0922  Selects the host computer 2 OS.

<table>
<thead>
<tr>
<th>[Data type]</th>
<th>Byte</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Valid data range]</td>
<td>0 to 2</td>
</tr>
<tr>
<td>0: Windows 95/98/Me/2000/XP.</td>
<td></td>
</tr>
<tr>
<td>1: UNIX/VMS.</td>
<td></td>
</tr>
<tr>
<td>2: Linux.</td>
<td></td>
</tr>
</tbody>
</table>
0923
Selects the host computer OS.
[Data type] Byte
[Valid data range] 0 to 2
0: Windows 95/98/Me/2000/XP.
1: UNIX/VMS.
2: Linux.

0930
Maximum number of files that can be registered to the memory card of the Data Server and maximum size per file that can be registered.
[Data type] Byte
[Valid data range] 0, 10 to 15

<table>
<thead>
<tr>
<th>No.930</th>
<th>Maximum number of files</th>
<th>Maximum size per file</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2047</td>
<td>512MB</td>
</tr>
<tr>
<td>10</td>
<td>511</td>
<td>2048MB</td>
</tr>
<tr>
<td>11</td>
<td>1023</td>
<td>1024MB</td>
</tr>
<tr>
<td>12</td>
<td>2047</td>
<td>512MB</td>
</tr>
<tr>
<td>13</td>
<td>4095</td>
<td>256MB</td>
</tr>
<tr>
<td>14</td>
<td>8191</td>
<td>128MB</td>
</tr>
<tr>
<td>15</td>
<td>16383</td>
<td>64MB</td>
</tr>
</tbody>
</table>

NOTE
1 When the memory card is formatted after this parameter is set, the maximum number of files and maximum size per file are changed.
2 Each folder is counted as one file.
3 This parameter is valid when the series and edition of the Data Server function software are edition 11 or later of series 6569.

3107
[SOR]
In the Data Server FILE LIST screen, files are displayed:
0: In the order of zero-suppressed program number.
1: In the order of program name.

3193
[ODR]
In the file list display of the Data Server, the program size is indicated in:
0: KB
1: Pages

3233
[PDM]
When the Data Server FILE LIST screen is displayed:
1: The setting of a foreground/background folder is enabled.
0: The setting of an M198 operation folder/DNC operation file is enabled.
2.3 EXAMPLE OF SETTING THE DATA SERVER FUNCTIONS

An example of setting for operating the Data Server functions is given below. In this example of setting, one personal computer is connected to two CNCs through a Data Server.

### IP ADDRESS
- **CNC 1**: 192.168.0.100
- **CNC 2**: 192.168.0.101

### SUBNET MASK
- **CNC 1**: 255.255.255.0
- **CNC 2**: 255.255.255.0

### ROUTER IP ADDRESS
- **CNC 1**: None
- **CNC 2**: None

### PORT NUMBER
- **CNC 1**: 21
- **CNC 2**: 21

### USER NAME
- **CNC 1**: user
- **CNC 2**: user

### PASSWORD
- **CNC 1**: user
- **CNC 2**: user

### LOGIN FOLDER
- **CNC 1**: None
- **CNC 2**: None

### DATA SERVER MODE
- **CNC 1**: Storage
- **CNC 2**: Storage

### NC Parameter NO. 20
- **CNC 1**: 5
- **CNC 2**: 5

---

### PC 1

<table>
<thead>
<tr>
<th></th>
<th>192.168.0.200</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td></td>
</tr>
<tr>
<td>Sub-net mask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Default gateway</td>
<td>None</td>
</tr>
<tr>
<td>User name</td>
<td>user</td>
</tr>
<tr>
<td>Password</td>
<td>user</td>
</tr>
<tr>
<td>Home folder</td>
<td>default</td>
</tr>
</tbody>
</table>

---

- "Microsoft TCP/IP property" of the personal computer (Windows2000/WindowsXP) is used for setting.
- "User account" of the personal computer (Windows2000/WindowsXP) is used for setting.
- "Internet service manager" of the personal computer (Windows2000/WindowsXP) is used for setting.
3. SETTING THE FOCAS2/Ethernet FUNCTIONS

This chapter describes the setting of parameters for the FOCAS2/Ethernet functions and CNC screen display functions.

⚠️ CAUTION
Before performing communication using the FOCAS2/Ethernet functions for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network. In particular, IP address duplication causes an intermittent communication failure in the Data Server, which can result in a system error in the CNC. So, be very careful when making settings.

Note on using the FOCAS2/Ethernet functions

NOTE
With the FOCAS2/Ethernet functions, up to 20 FOCAS2/Ethernet clients can be connected to one CNC.

Note on using the CNC screen display functions

NOTE
With the CNC screen display functions, up to 1 CNC screen display function client can be connected to one CNC.
3.1 OPERATING THE FOCAS2/Ethernet SETTING SCREEN

This section describes the setting screen for operating the FOCAS2/Ethernet functions and CNC screen display functions.

Procedure

1. Press the function key \( \text{SYSTEM} \).
2. Soft key [ETHER BOARD] appear. (When there is no soft keys, press the continue key.)
3. Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4. Press soft keys [COMMON] and [FOCAS2] and then enter parameters for the items that appear.
COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP ADDRESS</td>
<td>Specify the IP address of the FAST Ethernet/ FAST Data Server.</td>
</tr>
<tr>
<td></td>
<td>(Example of specification format: &quot;192.168.0.100&quot;)</td>
</tr>
<tr>
<td>SUBNET MASK</td>
<td>Specify a mask address for the IP addresses of the network.</td>
</tr>
<tr>
<td></td>
<td>(Example of specification format: &quot;255.255.255.0&quot;)</td>
</tr>
<tr>
<td>ROUTER IP ADDRESS</td>
<td>Specify the IP address of the router.</td>
</tr>
<tr>
<td></td>
<td>Specify this item when the network contains a router.</td>
</tr>
<tr>
<td></td>
<td>(Example of specification format: &quot;192.168.0.253&quot;)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC ADDRESS</td>
<td>FAST Ethernet/ FAST Data Server MAC address</td>
</tr>
</tbody>
</table>

NOTE
The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4, "SETTING THE DNS/DHCP FUNCTION" provided later.
Press soft key [FOCAS2] to display the FOCAS2 screen.

**Setting item**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT NUMBER (TCP)</td>
<td>Specifies the port No. to be used by the FOCAS2/Ethernet functions and CNC screen display functions, within a range of 5001 to 65535.</td>
</tr>
<tr>
<td>PORT NUMBER (UDP)</td>
<td>Set 0 when using this item for the FOCAS2/Ethernet functions and CNC screen display functions.</td>
</tr>
<tr>
<td>TIME INTERVAL</td>
<td>Set 0 when using this item for the FOCAS2/Ethernet functions and CNC screen display functions.</td>
</tr>
</tbody>
</table>

**NOTE**

1. For connection with the FANUC CIMPlicity i CELL, make the above setting according to "FANUC CIMPlicity i CELL OPERATOR'S MANUAL (B-75074EN)."

2. The unit of TIME INTERVAL is 10 ms. The allowable input range is 10 to 65535. Values less than 100 ms cannot be set.

3. If a smaller value is set in TIME INTERVAL, the communication load can increase to adversely affect the performance of the network. Example) If 100 is set, broadcast data is transmitted at intervals of 1 second [1000 ms] (=100×10).
### 3.2 RELATED NC PARAMETERS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Data type</th>
<th>Valid data range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0020</td>
<td>I/O CHANNEL: Input/output device selection</td>
<td>Byte</td>
<td>#7 #6 #5 #4 #3 #2 #1 #0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6: Selects the FOCAS2/Ethernet as the input/output device. This parameter is required only for DNC operation, however.</td>
</tr>
<tr>
<td>0905</td>
<td>DNCE</td>
<td>Bit</td>
<td>DNCE</td>
</tr>
<tr>
<td></td>
<td>During DNC operation using the FOCAS2/Ethernet functions, the termination of DNC operation is:</td>
<td></td>
<td>0: Waited.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1: Not waited. (FOCAS2/HSSB compatible specification)</td>
</tr>
<tr>
<td>0924</td>
<td>FOCAS2/Ethernet waiting time setting</td>
<td>Byte</td>
<td>0 to 32767</td>
</tr>
<tr>
<td></td>
<td>When the FOCAS2/Ethernet and Data Server functions are used simultaneously, this parameter sets the FOCAS2/Ethernet function waiting time in milliseconds. When a value of 0 is set, the functions operate with assuming that 1 millisecond is specified.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 3.3 EXAMPLE OF SETTING THE FOCAS2/Ethernet FUNCTIONS

An example of setting for operating the FOCAS2/Ethernet functions is given below. In this example of setting, one personal computer is connected to two CNCs through a FOCAS2/Ethernet.

#### Diagram

![Diagram showing network setup with CNCs and PC connected through a hub with 100BASE-TX (or 10BASE-T) connection]

#### Table

<table>
<thead>
<tr>
<th></th>
<th>CNC 1</th>
<th>CNC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP ADDRESS</td>
<td>192.168.0.100</td>
<td>192.168.0.101</td>
</tr>
<tr>
<td>SUBNET MASK</td>
<td>255.255.255.0</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>ROUTER IP ADDRESS</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>PORT NUMBER (TCP)</td>
<td>8193</td>
<td>8193</td>
</tr>
<tr>
<td>PORT NUMBER (UDP)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TIME INTERVAL</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### PC 1

- **IP address**: 192.168.0.200
- **Sub-net mask**: 255.255.255.0
- **Default gateway**: None

#### CNC 1

- **NC IP address**: 192.168.0.100
- **NC TCP port number**: 8193

#### CNC 2

- **NC IP address**: 192.168.0.101
- **NC TCP port number**: 8193

*The common setting screen is used for setting.*

*The FOCAS2 setting screen is used for setting.*

"Microsoft TCP/IP property" of the personal computer (Windows 95/98/NT/2000/XP) is used for setting.

Specify these items with the arguments of the data window library function "cnc_allclibhnd13."
This chapter describes the setting of the DNS/DHCP function.
4.1  SETTING OF DNS

This section describes the setting procedure for operating DNS.

Procedure

1. Enable the DNS function according to Section 4.3, "RELATED NC PARAMETERS" provided later.
2. Set up the DNS server on the host computer. For information about setup, see Appendix C, "EXAMPLE OF DNS/DHCP SETUP."
3. Make a connection to the host computer where the DNS server operates (hereinafter referred to as the "DNS server") and restart the CNC, then press the function key [SYSTEM] .
4. Press soft key [ETHER BOARD], then press [COMMON] to display the COMMON (DETAIL) screen.
5. As the DNS IP address, enter the IP address of the DNS server.
Press soft key [COMMON] then page keys \( \text{ PAGE } \) to display the COMMON (DETAIL) screen. Set the setting items for DNS IP addresses.

### Setting item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS IP ADDRESS 1, 2</td>
<td>Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.</td>
</tr>
</tbody>
</table>
4.2 SETTING OF DHCP

This section describes the setting procedure for operating DHCP.

**Procedure**

1. Enable the DHCP function according to Section 4.3 "RELATED NC PARAMETERS" provided later.
2. Set up the DHCP server on the host computer. For information about setup, see Appendix C, "EXAMPLE OF DNS/DHCP SETUP."
3. Make a connection to the host computer where the DHCP server operates (hereinafter referred to as the "DHCP server") and restart the CNC, then press the function key [SYSTEM].
4. Press soft key [ETHER BOARD], then press [COMMON] to display the COMMON screen.
5. If the DHCP function of the CNC is enabled and a connection is made successfully with the DHCP server, the following items are set automatically from the DHCP server:
   - IP ADDRESS
   - SUBNET MASK
   - ROUTER IP ADDRESS
   - DNS IP ADDRESS
   - DOMAIN
   If an attempt to make a connection with the DHCP server fails, "DHCP ERROR" is indicated in each item.
6. Moreover, if the DNS function is enabled at the same time and the DHCP server interacts with the DNS server (the DNS server supports dynamic DNS), enter a desired host name.
COMMON screens (BASIC, DETAIL)

Press soft key [COMMON] then page keys PAGE to display the COMMON screens (BASIC and DETAIL). If a connection is made successfully with the DHCP server and setting data is acquired, the following is displayed:

When a connection with the DHCP server has been made successfully

If no host name is set, the CNC automatically sets a host name in the format "NC-<MAC address>".

Example of host name automatically set
If an attempt to make a connection with the DHCP server fails, the following is displayed:

### Check item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP ADDRESS</td>
<td>If a connection is made successfully with the DHCP server, data acquired from the DHCP server is displayed.</td>
</tr>
<tr>
<td>SUBNET MASK</td>
<td>If an attempt to make a connection with the DHCP server fails, &quot;DHCP ERROR&quot; is displayed.</td>
</tr>
<tr>
<td>ROUTER IP ADDRESS</td>
<td></td>
</tr>
<tr>
<td>DNS IP ADDRESS 1, 2</td>
<td></td>
</tr>
<tr>
<td>DOMAIN</td>
<td></td>
</tr>
</tbody>
</table>

### Setting item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOST NAME</td>
<td>Enter a desired CNC host name.</td>
</tr>
<tr>
<td></td>
<td>If the DHCP server interacts with the DNS server, this host name is posted to the DNS server.</td>
</tr>
<tr>
<td></td>
<td>If no host name is set, &quot;NC-&lt;MAC address&gt;&quot; is automatically set.</td>
</tr>
<tr>
<td></td>
<td>Example of host name automatically set: NC-00E0E4004CF9</td>
</tr>
</tbody>
</table>

### Display item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC ADDRESS</td>
<td>FAST Ethernet/FAST Data Server MAC address</td>
</tr>
</tbody>
</table>
### 4.3 RELATED NC PARAMETERS

<table>
<thead>
<tr>
<th>#7 #6 #5 #4 #3 #2 #1 #0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>0904</strong></td>
</tr>
</tbody>
</table>

[Data type] Bit

**DHCP** The DHCP function is:
0: Not used.
1: Used.

**DNS** The DNS function is:
0: Not used.
1: Used.

**D1ET** When the DHCP function is used:
0: The default parameters for the FOCAS2/Ethernet functions are set.
   Port number (TCP) 8193
   Port number (UDP) 0
   Time interval 0

1: The default parameters for i CELL communication are set.
   Port number (TCP) 8193
   Port number (UDP) 8192
   Time interval 50

If any of these parameters has been modified, the power must be turned off then back on for the modification to become effective.

**NOTE**
Set D1ET to 1 to make a connection with the FANUC CIMPLICITY i CELL and use the DHCP function and DNS function.
EXAMPLE OF SETTING DNS/DHCP

When DNS/DHCP is Used with the Data Server

When a connection is made with the FTP server of the host computer (hereinafter referred to as the "FTP server") by using the Data Server function, the IP address of the CNC can be set from the DHCP server by enabling the DHCP function of the CNC. Moreover, by enabling the DNS function of the CNC, an FTP server can be specified with a host name instead of an IP address.

Example of specifying a connection destination with a host name (FTPServer-1)
4. SETTING THE DNS/DHCP FUNCTION

Setting the DNS server / DHCP server

Operating system

It is recommended to use Windows 2000 Server as the operating system.

Setting the DHCP server

In the database of the DHCP server, set the following items:
- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Section C.1, "EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.

For DNS server setting, see Section C.2, "EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the FTP server

For FTP server setting, see Appendix D, "EXAMPLE OF FTP SERVER SETUP."

Setting the CNC

Parameter

To enable the DNS function, set bit 5 of NC parameter No. 904 to 1.
To enable the DHCP function, set bit 6 of NC parameter No. 904 to 1.
4.4.2 When DHCP is Used with the FTP Server Function of the Data Server

The Data Server (FTP server function) can be accessed by specifying a host name from an FTP client where an FTP client operates (hereinafter referred to as an "FTP client"), using the interaction between the DHCP server and DNS server operating with Windows 2000 Server.

The DHCP function of the CNC is enabled.

Flow of operation

When the system is initialized or the system configuration is modified

1. A host name is set on the CNC.
2. When the power is turned on, the Data Server posts the host name to the DHCP server.
3. The DHCP server assigns an IP address, and the table of correspondence between CNC host names and CNC IP addresses is updated.

When operation is performed from an FTP client

1. An FTP client inquires of the DNS server about the IP address of a CNC.
2. The FTP client acquires the IP address of the CNC.
3. The FTP client communicates with the FTP server of the CNC by using the IP address of the CNC.
Setting the DNS server/DHCP server

Operating system

It is recommended to use Windows 2000 Server as the operating system. (The DNS server and DHCP server supporting dynamic DNS need to operate.)

Setting the DHCP server

In the database of the DHCP server, set the following items:

- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Section C.1, "EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.

For DNS server setting, see Section C.2, "EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the CNC

Parameter

To enable the DHCP function, set bit 6 of NC parameter No. 904 to 1. As a host name, set a desired name. Otherwise, a name automatically set by the FAST Ethernet/FAST Data Server is used.
4.4.3 When DHCP is Used with the FOCAS2/Ethernet Function

Ethernet parameters can be set with no setting performed from the CNC, using the interaction between the DHCP server and DNS server operating with Windows 2000 Server. The DHCP function of the CNC is enabled.

Flow of operation

When the system is initialized or the system configuration is modified
1. A host name is set on the CNC.
2. When the power is turned on, the CNC posts the host name to the DHCP server.
3. The DHCP server assigns an IP address, and the table of correspondence between CNC host names and CNC IP addresses is updated.

When FOCAS2/Ethernet application software is executed
1. The user's application inquires of the DNS server about the IP address of a CNC.
2. The user's application acquires the IP address of the CNC.
3. The user's application communicates with the CNC by using the IP address of the CNC.
Setting the DNS server/DHCP server

Operating system

It is recommended to use Windows 2000 Server as the operating system. (The DNS server and DHCP server supporting dynamic DNS need to operate.)

Setting the DHCP server

In the database of the DHCP server, set the following items:
- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Section C.1, "EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.

For DNS server setting, see Section C.2, "EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server" in Appendix C, "EXAMPLE OF SETTING UP DNS/DHCP."

Setting the CNC

Parameter

To enable the DHCP function, set bit 6 of NC parameter No. 904 to 1.

As a host name, set a desired name. Otherwise, a name automatically set by the FAST Ethernet/FAST Data Server is used.

When the DHCP function is enabled, the FOCAS2/Ethernet-related parameters are automatically set if bit 3 of NC parameter No. 904 is set to 0. If bit 3 of NC parameter No. 904 is set to 1, the parameters for i CELL communication are automatically set.
This chapter describes the setting of parameters for the machine remote diagnosis functions.
For explanation of the entire machine remote diagnosis functions, refer to "MACHINE REMOTE DIAGNOSIS PACKAGE OPERATOR'S MANUAL (B-63734EN)."
5.1 OPERATING THE MACHINE REMOTE DIAGNOSIS SETTING SCREEN

This section describes the setting screen for operating the machine remote diagnosis functions.

Procedure

1. Press the function key [SYSTEM].
2. Soft key [ETHER BOARD] appears. (When there is no soft key, press the continue key.)
3. Press soft key [ETHER BOARD] to display the Ethernet Setting screen.
4. Press soft keys [COMMON], [FOCAS2], and [REMOTE DIAG] and then enter parameters for the items that appear.
Press soft key [COMMON] to display the COMMON screen (BASIC).

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP ADDRESS</td>
<td>Specify the IP address of the FAST Ethernet / FAST Data Server.</td>
</tr>
<tr>
<td>SUBNET MASK</td>
<td>Specify a mask address for the IP addresses of the network.</td>
</tr>
<tr>
<td>ROUTER IP ADDRESS</td>
<td>Specify the IP address of the router. Specify this item when the network contains a router.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC ADDRESS</td>
<td>FAST Ethernet / FAST Data Server MAC address</td>
</tr>
</tbody>
</table>

**NOTE**
The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Chapter 4 "SETTING THE DNS/DHCP FUNCTION".
Press soft key [COMMON] then page keys PAGE UP PAGE DOWN to display the COMMON (DETAIL) screen. Set the setting items for DNS IP addresses.

### Setting item

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS IP ADDRESS 1, 2</td>
<td>Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.</td>
</tr>
</tbody>
</table>
FOCAS2 screen

Press soft key [FOCAS2] to display the FOCAS2 screen.

![FOCAS2/Ethernet: Setting (BOARD)](image)

**Setting item**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT NUMBER (TCP)</td>
<td>Specifies the port No. to be used by the machine remote diagnosis functions (FOCAS2/Ethernet functions), within a range of 5001 to 65535.</td>
</tr>
<tr>
<td>PORT NUMBER (UDP)</td>
<td>Set 0 when using this item for the machine remote diagnosis functions (FOCAS2/Ethernet functions). Set this port number to communicate with the FANUC CIMPLICITY i CELL.</td>
</tr>
<tr>
<td>TIME INTERVAL</td>
<td>Set 0 when using this item for the machine remote diagnosis functions (FOCAS2/Ethernet functions). Set this time interval to communicate with the FANUC CIMPLICITY i CELL.</td>
</tr>
</tbody>
</table>

**NOTE**

1. For connection with the FANUC CIMPLICITY i CELL, make the above setting according to "FANUC CIMPLICITY i CELL OPERATOR'S MANUAL (B-75074EN)."

2. The unit of TIME INTERVAL is 10 ms. The allowable input range is 10 to 65535. Values less than 100 ms cannot be set.

3. If a smaller value is set in TIME INTERVAL, the communication load can increase to adversely affect the performance of the network. Example) If 100 is set, broadcast data is transmitted at intervals of 1 second [1000 ms] (=100×10).
Press soft key [REMOTE DIAG] to display the MACHINE REMOTE DIAG screen (COMMON).

Machine remote diagnosis screen (BASIC)

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MTB ID</td>
<td>This information is required by the machine remote diagnosis package to confirm that the diagnosis request is issued from a machine manufactured by the machine tool builder. The MTB identification information on the diagnosis accepting server of the machine remote diagnosis package can be set to accept diagnosis requests only from the machines manufactured by the machine tool builder. (Example of specification format: &quot;FANUC&quot;)</td>
</tr>
<tr>
<td></td>
<td>MACHINE ID</td>
<td>Information required by the machine remote diagnosis package to identify the machine under diagnosis (Example of specification format: &quot;217xxx-1011xxxxx&quot;)</td>
</tr>
</tbody>
</table>
MACHINE REMOTE DIAG screen (INQUIRY1, INQUIRY2, INQUIRY3)

Press soft key [REMOTE DIAG] to display the MACHINE REMOTE DIAG screen.

By using page keys PAGE PAG, the three host computers at inquiry destinations 1, 2, and 3 can be set.

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOST NAME</td>
<td>Specify the IP address of the host computer (machine remote diagnosis accepting server) when the DNS function is disabled. (Example of specification format: &quot;200.201.202.203&quot;) Specify the host name of the host computer (machine remote diagnosis accepting server) when the DNS function is enabled. (You can specify up to 63 characters.) (Example of specification format: &quot;RMTDIAG.FANUC.CO.JP&quot;)</td>
</tr>
<tr>
<td>PORT NUMBER</td>
<td>Specify a port number. Usually, specify &quot;8194&quot; because the machine remote diagnosis functions are used.</td>
</tr>
<tr>
<td>INQUIRY NAME</td>
<td>Specify information for identifying the host computer (machine remote diagnosis accepting server). (You can specify up to 63 characters.) (Example of specification format: &quot;FANUC LTD.&quot;)</td>
</tr>
</tbody>
</table>
5.2 RELATED NC PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0024</td>
<td>Setting of communication with the PMC ladder development tool</td>
</tr>
<tr>
<td>[Data type] Byte</td>
<td></td>
</tr>
<tr>
<td>[Valid data range] 10: The high-speed interface (Ethernet) is used for PMC online editing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0904</td>
<td>DNS</td>
</tr>
<tr>
<td>[Data type] Bit</td>
<td></td>
</tr>
<tr>
<td>DNS</td>
<td>The DNS function is:</td>
</tr>
<tr>
<td>0:</td>
<td>Not used.</td>
</tr>
<tr>
<td>1:</td>
<td>Used.</td>
</tr>
</tbody>
</table>

If this parameter has been modified, the power must be turned off then back on for the modification to be become effective.

**NOTE**

To use the DNS function, set DNS IP ADDRESS 1 and DNS IP ADDRESS 2 on the COMMON (DETAIL) screen.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8706</td>
<td>MRD</td>
</tr>
<tr>
<td>[Data type] Bit</td>
<td></td>
</tr>
<tr>
<td>MRD</td>
<td>Type of communication device to be used by the machine remote diagnosis functions:</td>
</tr>
<tr>
<td>0:</td>
<td>The FAST Ethernet/FAST Data Server is not used.</td>
</tr>
<tr>
<td>1:</td>
<td>The FAST Ethernet/FAST Data Server is used.</td>
</tr>
</tbody>
</table>

If this parameter has been modified, the power must be turned off then back on for the modification to be become effective.
## 5.3 CONTROLLING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS FROM THE PMC

You can use signals from the PMC to control the start and forced termination of the machine remote diagnosis functions and post the status of the machine remote diagnosis functions and error numbers to the PMC ladder.

### 5.3.1 Signals

<table>
<thead>
<tr>
<th>No.</th>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>G0141</td>
<td>DIAREQ</td>
<td>DIASTP</td>
<td>INQU2</td>
<td>INQU1</td>
<td>INQU0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DIAREQ**

- **[Name]** Signal to request machine remote diagnosis
- **[Classification]** Input signal
- **[Function]** Requests the start of machine remote diagnosis.
- **[Operation]** When this signal is set to "1", it requests the start of machine remote diagnosis to the inquiry destination according to the signals indicating the number of the inquiry destination (INQU0 to INQU2). When the acceptance completion signal (RMTEND) or acceptance reject signal (RMTCAN) is set to "1", this signal is set to "0".

**DIASTP**

- **[Name]** Signal to request machine remote diagnosis cancellation
- **[Classification]** Input signal
- **[Function]** Requests the forced termination of machine remote diagnosis.
- **[Operation]** When this signal is set to "1", it requests forced termination to the machine remote diagnosis accepting server. When the completion signal for machine remote signal cancel acceptance (RMTCLS) is set to "1", this signal is set to "0".

**INQU2**

- **[Name]** Inquiry number select signals
- **[Classification]** Input signal
- **[Function]** Inquiry destination for which to start machine remote diagnosis
- **[Operation]** Select an item from the table below as an inquiry destination for which to start machine remote signal.

<table>
<thead>
<tr>
<th>INQU2</th>
<th>INQU1</th>
<th>INQU0</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>No selection</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Inquiry destination 1</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Inquiry destination 2</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
<td>Inquiry destination 3</td>
</tr>
</tbody>
</table>
5. SETTING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS

<table>
<thead>
<tr>
<th>No.</th>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>F0082</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RMTCLS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RMTCLS**

- **[Name]**: Completion signal for machine remote diagnosis cancel acceptance
- **[Classification]**: Output signal
- **[Function]**: Notifies that a request to cancel machine remote diagnosis has been accepted.
- **[Output condition]**: When machine remote diagnosis is canceled after the signal to request machine remote diagnosis cancellation (DIASTP) is set to "1", this signal is set to "1". When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0", this signal is set to "0".

<table>
<thead>
<tr>
<th>No.</th>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>F0083</td>
<td>RMTCAN</td>
<td>RMTEND</td>
<td>DIAST5</td>
<td>DIAST4</td>
<td>DIAST3</td>
<td>DIAST2</td>
<td>DIAST1</td>
<td>DIAST0</td>
</tr>
</tbody>
</table>

**RMTCAN**

- **[Name]**: Reject signal for machine remote diagnosis acceptance
- **[Classification]**: Output signal
- **[Function]**: Notifies that a machine remote diagnosis request has been rejected.
- **[Output condition]**: When the signal to request machine remote diagnosis (DIAREQ) is set to "1", a request to start machine remote diagnosis is issued to the machine remote diagnosis accepting server. When the server rejects the request, this signal is set to "1". When the signal to request machine remote diagnosis (DIAREQ) is set to "0", this signal is set to "0".

**RMTEND**

- **[Name]**: Completion signal for machine remote diagnosis acceptance
- **[Classification]**: Output signal
- **[Function]**: Notifies that a machine remote diagnosis request has been accepted by the machine remote diagnosis accepting server.
- **[Output condition]**: When the signal to request machine remote diagnosis (DIAREQ) is set to "1", a request to start machine remote diagnosis is issued to the machine remote diagnosis accepting server. When the server accepts the request, this signal is set to "1". When the signal to request machine remote diagnosis (DIAREQ) is set to "0", this signal is set to "0".
DIAST5 <F0083#5>
DIAST4 <F0083#4>
DIAST3 <F0083#3>
DIAST2 <F0083#2>
DIAST1 <F0083#1>
DIAST0 <F0083#0>

[Name] Notification signals for the machine remote diagnosis status
[Classification] Output signal
[Output condition] The status of machine remote diagnosis is reported as listed in the following table.

<table>
<thead>
<tr>
<th>DIAST5</th>
<th>DIAST4</th>
<th>DIAST3</th>
<th>DIAST2</th>
<th>DIAST1</th>
<th>DIAST0</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>No status</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>OPEN</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>OPENING</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>ACCEPTED</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>REFUSED</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>DIAGNOSING</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>CLOSE</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>FORCE CLOSING</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>ERROR</td>
</tr>
</tbody>
</table>

DIAER7 <F0088#7>
DIAER6 <F0088#6>
DIAER5 <F0088#5>
DIAER4 <F0088#4>
DIAER3 <F0088#3>
DIAER2 <F0088#2>
DIAER1 <F0088#1>
DIAER0 <F0088#0>

[Name] Notification signals for a machine remote diagnosis error number
[Classification] Output signal
[Function] Report an error number of machine remote diagnosis.
[Output condition] These signals indicate an error number of machine remote diagnosis. The error number is 0 to 255 in binary format.
5.3.2 Signal Timing Charts

This section describes control of the start and forced termination of machine remote diagnosis according to the signals from the PMC using timing charts.

5.3.2.1 When the start of machine remote diagnosis is accepted

<1> Before the signal to request machine remote diagnosis (DIAREQ) is set to "1", an inquiry destination for which to start the remote diagnosis functions is selected using the inquiry destination number signals (INQU0, INQU1, and INQU2). In this example, "inquiry destination 3" is selected by setting INQU0 = 1, INQU1 = 1, and INQU2 = 0.

<2> The signal to request machine remote diagnosis (DIAREQ) is set to "1".

<3> When the machine remote diagnosis package accepts the request to start diagnosis, the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "1".

<4> When the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "1", the signal to request machine remote diagnosis (DIAREQ) is set to "0".

<5> When the signal to request machine remote diagnosis (DIAREQ) is set to "0", the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "0".

INQU0 (G141#0)
INQU1 (G141#1)
INQU2 (G141#2)
DIAREQ (G141#5)
RMTEND (F083#6)

The start of machine remote diagnosis is accepted.
5.3.2.2 When the start of machine remote diagnosis is rejected

- Before the signal to request machine remote diagnosis (DIAREQ) is set to "1", an inquiry destination for which to start the remote diagnosis functions is selected using the inquiry destination number signals (INQU0, INQU1, and INQU2). In this example, "inquiry destination 3" is selected by setting INQU0 = 1, INQU1 = 1, and INQU2 = 0.

- The signal to request machine remote diagnosis (DIAREQ) is set to "1".

- When the machine remote diagnosis package rejects the request to start diagnosis, the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "1".

- When the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "1", the signal to request machine remote diagnosis (DIAREQ) is set to "0".

- When the signal to request machine remote diagnosis (DIAREQ) is set to "0", the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "0".
5.3.2.3 When machine remote diagnosis is forcibly terminated

-<1>- When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "1", the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "1".
-<2>- When the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "1", the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0".
-<3>- When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0", the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "0" and the machine remote diagnosis functions are forcibly terminated.

Machine remote diagnosis is forcibly terminated.
5.4 EXAMPLE OF SETTING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS

An example of setting for operating the machine remote diagnosis functions is given below. In this example of setting, one personal computer functions as the machine remote diagnosis accepting server and machine remote diagnosis client and is connected to one CNC.

### CNC 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP ADDRESS</td>
<td>192.168.0.100</td>
</tr>
<tr>
<td>SUBNET MASK</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>ROUTER IP ADDRESS</td>
<td>None</td>
</tr>
<tr>
<td>PORT NUMBER (TCP)</td>
<td>8193</td>
</tr>
<tr>
<td>PORT NUMBER (UDP)</td>
<td>0</td>
</tr>
<tr>
<td>TIME INTERVAL</td>
<td>0</td>
</tr>
<tr>
<td>MTB ID</td>
<td>FANUC</td>
</tr>
<tr>
<td>MACHINE ID</td>
<td>217XXX-101XXXX</td>
</tr>
<tr>
<td>INQUIRY 1 : HOST NAME</td>
<td>192.168.0.200</td>
</tr>
<tr>
<td>INQUIRY 1 : PORT NUMBER</td>
<td>8194</td>
</tr>
</tbody>
</table>

- The common setting screen is used for setting.
- The FOCAS2 setting screen is used for setting.
- The machine remote diagnosis screen is used for setting.

### PC 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td>192.168.0.200</td>
</tr>
<tr>
<td>Sub-net mask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Default gateway</td>
<td>None</td>
</tr>
<tr>
<td>Accepting server : PORT NUMBER</td>
<td>8194</td>
</tr>
<tr>
<td>Proxy server : PORT NUMBER</td>
<td>8193</td>
</tr>
<tr>
<td>MTB ID</td>
<td>Accepts all diagnosis requests.</td>
</tr>
</tbody>
</table>

- "Microsoft TCP/IP property" of the personal computer (Windows 95/98/NT/2000/XP) is used for setting.
- "Diagnosis accepting server setting" of the machine remote diagnosis package is used for setting.
6 ERROR MESSAGES DISPLAYED DURING PARAMETER SETTING

This chapter explains the error messages that are issued when FAST Ethernet/FAST Data Server parameters are set.

<table>
<thead>
<tr>
<th>Messages</th>
<th>Meaning and action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Software is not found</td>
<td>Check whether the communication software is installed.</td>
</tr>
<tr>
<td>Ethernet board is not found</td>
<td>Check whether the Ethernet board is installed.</td>
</tr>
<tr>
<td>Software Version Error</td>
<td>The communication software version is illegal.</td>
</tr>
<tr>
<td></td>
<td>Check the software version.</td>
</tr>
<tr>
<td>DATA IS OUT OF RANGE</td>
<td>A numeric parameter value is beyond the range.</td>
</tr>
<tr>
<td></td>
<td>Check the setting conditions described in the relevant manual.</td>
</tr>
<tr>
<td>Wrong Character(s)</td>
<td>An illegal character is used in a character parameter.</td>
</tr>
<tr>
<td>Format Error</td>
<td>Input data such as an IP address has an illegal input format.</td>
</tr>
<tr>
<td>too many figures</td>
<td>A value input in a numeric parameter consists of too many digits.</td>
</tr>
<tr>
<td>Data was rejected</td>
<td>A parameter error is found.</td>
</tr>
<tr>
<td></td>
<td>Confirm the setting conditions described in the relevant manual.</td>
</tr>
<tr>
<td>Reading from SRAM failed</td>
<td>SRAM may have been destroyed.</td>
</tr>
<tr>
<td>Writing into SRAM failed</td>
<td>SRAM may have been destroyed.</td>
</tr>
<tr>
<td>DHCP is available</td>
<td>When the DHCP function is enabled, it is impossible to input parameters manually from the setting screen.</td>
</tr>
<tr>
<td></td>
<td>To input parameters manually, disable the DHCP function.</td>
</tr>
<tr>
<td>Error(xxxx)</td>
<td>Other errors.</td>
</tr>
<tr>
<td></td>
<td>Check the parameter settings and contact FANUC.</td>
</tr>
</tbody>
</table>
IV. OPERATION
This chapter describes how to operate the Data Server functions.

On the PROGRAM FOLDER screen, files on the CNC memory, memory card, host computer connected via the embedded Ethernet, memory card built into the FAST Data Server, or host computer connected via the FAST Data Server can be handled by selecting a device.

In this manual, the method of handling files on the memory card built into the FAST Data Server and on the host computer connected via the FAST Data Server is described.
1.1 DEVICE CHANGE ON THE PROGRAM FOLDER SCREEN

Procedure

1. Press the function key \( \text{PROG} \).

2. Press soft key [FOLDER] to display the PROGRAM FOLDER screen. (When there is no soft keys, press the continue key.)

3. Press soft key [(OPRT)] then soft key [DEVICE CHANGE] to display the soft keys for selectable devices.

4. When you press soft key [DTSVR], the information displayed on the PROGRAM FOLDER screen is changed to the contents (DATA SERVER FILE LIST screen) of the memory card built into the FAST Data Server to enable file operation.

5. When you press soft key [DTSVR HOST], the information displayed on the PROGRAM FOLDER screen is changed to the contents (DATA SERVER HOST FILE LIST screen) of the hard disk of the host computer to enable file operation.
1.2 OPERATING THE DATA SERVER FILE LIST SCREEN

If [DTSVR] is selected to change the device on the PROGRAM FOLDER screen, the contents (DATA SERVER FILE LIST screen) of the memory card built into the FAST Data Server are displayed to enable file operation.

The information displayed on the DATA SERVER FILE LIST screen partly changes, depending on the setting of bit 1 (PDM) of NC parameter No. 3233.
When bit 1 (PDM) of parameter No. 3233 is set to 0, an M198 operation folder and DNC operation file can be set.
When bit 1 (PDM) of parameter No. 3233 is set to 1, foreground/background folders can be set.
1. OPERATING THE DATA SERVER FUNCTIONS

DATA SERVER FILE LIST

**DATA SERVER FILE LIST screen / When PDM=0 (No.3233#1=0)**

```
01198 N00000
```

```
| Mi90 DPE FOLDER   | //DATA_SV/PRG1/ |
| Mi90 DPE FILE    | //DATA_SV/DATASERVER_Sub_Program |
| FREE PAGE        | 12008616000Byte  |
| FREE FILES       | 1906 |

DEVICE: DATA_SV (CURRENT FOLDER: //DATA_SV )

FITSERVER

PRG1

PRG3

DATASERVER_Sub_Program

FITTEST.TXT

LongFileNameFile.LongExt

0000A

0000B

0000C

0000D

0000E
```

DATA SERVER FILE LIST screen / When PDM=1 (No.3233#1=1)

```
01198 N00000
```

```
| Mi90 DPE FOLDER   | //DATA_SV/PRG1/ |
| Mi90 DPE FILE    | //DATA_SV/DATASERVER_Sub_Program |
| FREE PAGE        | 12008616000Byte  |
| FREE FILES       | 1906 |

DEVICE: DATA_SV (CURRENT FOLDER: //DATA_SV )

FITSERVER

PRG1

PRG3

DATASERVER_Sub_Program

FITTEST.TXT

LongFileNameFile.LongExt

0000A

0000B

0000C

0000D

0000E
```
Display item

M198 OPE FOLDER
Displays a folder (directory) for M198-based subprogram calling. This item is displayed when bit 1 (PDM) of parameter No. 3233 is set to 0.

DNC OPE FILE
Displays a file name used when DNC operation is performed. This item is displayed when bit 1 (PDM) of parameter No. 3233 is set to 0.

FOREGROUND FOLDER / BACKGROUND FOLDER
Displays foreground/background folders (directories). This item is displayed when bit 1 (PDM) of parameter No. 3233 is set to 1.

CONNECT HOST
Displays the work folder and the number of the host currently connected.

USED PAGE / FREE PAGE
Displays the size used of the memory card built into the FAST Data Server and the size that is free.

USED FILES / FREE FILES
Displays the total number of folders (files) in use of the Data Server and the number of remaining free folders (files).

DEVICE
Displays the current device. If the memory card built into the FAST Data Server is selected, "DATA_SV" is indicated.

CURRENT FOLDER
Displays the current work folder.

File list
Displays information about the files and folders in the current work folder.
## Operation list

### DEVICE CHANGE
Enables a device for display on the PROGRAM FOLDER screen. When selecting the memory card built into the FAST Data Server, press soft key [DTSVR].

### DNC SET
Specifies a file for DNC operation. This soft key can be used when bit 1 (PDM) of parameter No. 3233 is set to 0.

### M198 SET
Specifies a folder for M198-based subprogram calling. This soft key can be used when bit 1 (PDM) of parameter No. 3233 is set to 0.

### FORE CHANGE / BACK CHNAGE
Specifies a foreground/background folder. These soft keys can be used when bit 1 (PDM) of parameter No. 3233 is set to 1.

### MAIN PROGRM
Selects a file as a main program.

### DETAIL OFF / DETAIL ON
Switches the file list information to overall display or detail display.

### CREATE FOLDER
Creates a sub-folder under the current work folder.

### DELETE
Deletes a file or folder.

### RENAME
Renames a file or folder.

### SELECT START
Selects multiple files.

### COPY
Copies a file within the Data Server.

### SEARCH
Searches for a file in the current work folder.

### PUT
Transfers a file from the Data Server to the host computer.

### MPUT
Transfers multiple files from the Data Server to the host computer.
LIST-PUT

Transfers multiple files from the Data Server to the host computer according to a list file.

LIST-DELETE

Deletes multiple files from the Data Server according to a list file.

REFRESH

Updates the display information of the PROGRAM FOLDER screen.

NOTE

The operations of soft keys [CREATE FOLDER], [DELETE], [RENAME], [COPY], and [LIST-DELETE] are the target operations of the memory protection key. This means that when the memory protection key is enabled, these operations result in a "WRITE PROTECT" error and cannot be performed. For information about the memory protection key, refer to the CONNECTION MANUAL (FUNCTION) (B-63943EN-1) of the CNC.
1.2.1 Displaying and Operating the File List

REFRESH, DETAIL OFF, DETAIL ON

The contents of the file list can be updated and displayed.

1. Press soft key [REFRESH] to update the contents of the file list.
2. Press soft key [DETAIL OFF] to display a file name, size, and date.
3. Press soft key [DETAIL ON] to display a file list with file attributes and comments. A comment statement immediately following the O number of a file is displayed. When there is no comment statement, the contents starting with the beginning of the file are displayed.

NOTE

1. For a file selected as a main program and a file being used for memory operation, no comment is displayed in detail display mode.
2. The file attribute of a binary file is displayed as "R/B" to the right of the comment.

MOVE FOLDER

A folder can be moved.

1. By using cursor keys, select a folder to be moved.
2. Press the MDI key [INPUT].

CREATE FOLDER

A new folder can be created.

1. Move to a new folder to be created.
2. Enter a desired folder name.
3. Press soft key [CREATE FOLDER].

NOTE

1. Up to six levels of folders can be created.
2. No duplicate folder name is allowed within the same folder.
3. Each time a folder is created, the number of programs that can be registered decreases by one.
4. No folder may be able to be created, depending on the status such as operation state or protection state.
DELETE

A file or folder can be deleted.

1. By using cursor keys  
2. Press soft key [DELETE].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

NOTE
1. The initial folder cannot be deleted.
2. A folder can be deleted only when the folder is empty.
   (An empty folder means a folder that does not contain any folder and file.)
3. If a folder contains a folder or file that has the edit/display prohibition attribute set, the folder appears to be empty but is not actually empty. So, the folder cannot be deleted.
4. Files or folders may not be able to be deleted, depending on the status such as operation state or protection state.

DELETE (multiple files)

Multiple files can be deleted at a time.

1. Press soft key [SELECT START].
2. By using cursor keys  , select a file to be deleted.
3. Press soft key [SELECT].
   A selected file is displayed in reverse video.
   Repeat steps 2 and 3 for files to be deleted.
4. Press soft key [DELETE].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

NOTE
1. If a folder contains a file that has the edit/display prohibition attribute set, the folder appears to be empty but is not actually empty. So, the folder cannot be deleted.
2. Files may not be able to be deleted, depending on the status such as operation state or protection state.
3. Up to 10 files can be selected at a time.
RENAME

A file or folder can be renamed.

1. By using cursor keys ▼ ▲, select a file or folder to be renamed.
2. Key a new file name or folder name.
3. Press soft key [RENAME].

NOTE
1. The initial folder cannot be renamed.
2. No duplicate folder name is allowed within the same folder.
3. Files and folders may not be able to be renamed, depending on the status such as operation state or protection state.

COPY

In the Data Server, a file can be copied within the same folder.

1. Place the CNC in the EDIT mode.
2. By using cursor keys ▼ ▲, select a copy source file.
3. Key the name of a copy destination file.
4. Press soft key [COPY].

NOTE
1. Copy operation is impossible if the same file is specified as a copy source file and copy destination file.
2. Files may not be able to be copied, depending on the status such as operation state or protection state.
COPY (multiple files)

In the Data Server, multiple files can be copied.

1 Place the CNC in the EDIT mode.
2 Press soft key [SELECT START].
3 By using cursor keys \(\uparrow \downarrow\), select a copy source file.
4 Press soft key [SELECT].
   A selected file is displayed in reverse video.
   Repeat steps 2 and 3 for files to be copied.
5 Press soft key [SELECT END].
6 Move to a copy destination folder.
7 Press soft key [COPY].

NOTE
1 Copy operation is impossible if the same folder is specified as a copy source folder and copy destination folder.
2 Files may not be able to be copied, depending on the status such as operation state or protection state.
3 Up to 10 files can be selected at a time.

SEARCH

In the current work folder, a file can be found.

1 Enter a desired file name.
2 Press soft key [SEARCH].

LIST-DELETE

By using a list file, multiple files in the Data Server can be deleted.

1 By using cursor keys \(\uparrow \downarrow\), select a list file.
2 Press soft key [LIST-DELETE].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

When execution is selected, the files in the Data Server are deleted according to the list file.

NOTE
Files cannot sometimes be deleted depending on the operation status and protection status.
1.2.2 File Transfer Operation

Files can be transferred from the Data Server to the host computer.

**NOTE**

If an error occurs, check the cause of the error according to the Item, “ETHERNET LOG screen” in Section 2.1, "ETHERNET LOG" in Part VI, “MAINTENANCE.”

**PUT**

A file can be transferred from the Data Server to the host computer.

1. By using cursor keys , select a file to be transferred.
2. Press soft key [PUT].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.
3. When a file is to be transferred to the host computer under a different file name, enter the desired transfer destination file name before pressing soft key [PUT].

**MPUT**

Multiple files can be transferred from the Data Server to the host computer.

1. Enter the names of files to be transferred. File names can be specified using wildcards (*, ?).
2. Press soft key [MPUT].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

**LIST-PUT**

Multiple files can be transferred from the Data Server to the host computer according to a list file.

1. By using cursor keys , select a list file.
2. Press soft key [LIST-PUT].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

When execution is selected, the files are transferred from the Data Server to the host computer according to the list file.
1.2.3 Preparations for File Operation and Editing

**MAIN PROGRM**

A selected file can be registered as a main program.

1. Select the EDIT mode or MEM mode.
2. By using cursor keys [↓][↑], select a file to be registered as a main program.
3. Press soft key [MAIN PROGRM].

A registered main program can be executed in memory operation or edited.

**NOTE**

1. No file may be able to be selected, depending on the status such as operation state or protection state.
2. Only a text file can be selected as a main program.
3. For a file selected as a main program and a file being used for memory operation, no comment is displayed in detail display mode.
4. For a file selected as a main program, other file operations are disabled.
5. For memory operation and editing, refer to the USER'S MANUAL of the CNC.

**M198 SET**

A folder for M198-based subprogram calling can be specified.

1. Move to the folder containing a file to be called by M198-based subprogram calling.
2. Press soft key [M198 SET].

**NOTE**

1. No file may be able to be selected, depending on the status such as operation state or protection state.
2. This setting is valid when the operating mode of the Data Server is the storage mode.
DNC SET

A file used for DNC operation can be selected.

1. Move to the folder containing a file to be used for DNC operation.
2. By using cursor keys \(\downarrow\) \(\uparrow\), select a file to be used for DNC operation.
3. Press soft key [DNC SET].

NOTE

1. No file may be able to be selected, depending on the status such as operation state or protection state.
2. This setting is valid when the operating mode of the Data Server is the storage mode.

FORE CHANGE / BACK CHANGE

A foreground/background file can be specified.

1. Move to the folder containing a foreground/background file.
2. Press soft key [FORE CHANGE] or [BACK CHANGE].
1.3 OPERATING THE DATA SERVER HOST FILE LIST SCREEN

Host computer files can be operated on the DATA SERVER HOST FILE LIST screen.

DATA SERVER HOST FILE LIST

<table>
<thead>
<tr>
<th>Display item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M198 OPE FOLDER</td>
<td>Displays a folder (directory) for M198-based subprogram calling.</td>
</tr>
<tr>
<td>DNC OPE FILE</td>
<td>Displays a file name used when DNC operation is performed.</td>
</tr>
<tr>
<td>DT SERVER FOLDER</td>
<td>Displays the work folder (directory) of the Data Server (memory card).</td>
</tr>
<tr>
<td>CONNECT HOST</td>
<td>Displays the number of the host computer currently connected.</td>
</tr>
</tbody>
</table>
DEVICE
Displays the current device. If the host file list of the Data Server is selected, "DTSVR_HOST" is indicated.

CURRENT FOLDER
Displays the work folder in the current host computer.

FILE LIST
Displays information about the files and folders in the host computer.

Operation list

DEVICE CHANGE
Enables a device for display on the PROGRAM FOLDER screen. When selecting the host file list of the Data Server, press soft key [DTSVR HOST].

DNC SET
Specifies a file for DNC operation.

M198 SET
Specifies a folder for M198-based subprogram calling.

DETAIL OFF / DETAIL ON
Switches the file list information to overall display or detail display.

CREATE FOLDER
Creates a sub-folder under the current work folder.

DELETE
Deletes a file or folder.

RENAME
Renames a file or folder.

HOST CHANGE
Changes the connected host computer.

SEARCH
Searches for a file in the current folder.

GET
Transfers a file from the host computer to the Data Server.

MGET
Transfers files from the host computer to the Data Server by specifying a file name with wildcards (*, ?).
BGET

Transfers a file from the host computer to the Data Server in binary format. Use this soft key to transfer a binary-format NC program or data other than an NC program such as NC parameter or tool data.

LIST-GET

Transfers multiple files from the host computer to the Data Server according to a list file.

REFRESH

Updates the information displayed on the DATA SERVER HOST FILE LIST screen.

NOTE

The operations of soft keys [GET], [MGET], [BGET], and [LIST-GET] are the target operations of the memory protection key. This means that when the memory protection key is enabled, these operations result in a "WRITE PROTECT" error and cannot be performed. For information about the memory protection key, refer to the CONNECTION MANUAL (FUNCTION) (B-63943EN-1) of the CNC.
## Displaying and Operating the File List

### RENAME, DETAIL OFF, DETAIL ON

The contents of the file list can be updated and displayed.

1. Press soft key [REFRESH] to update the contents of the file list.
2. Press soft key [DETAIL OFF] to display a file name only.
3. Press soft key [DETAIL ON] to display a file attribute, size, date, and file name.

**NOTE**
The information displayed with soft key [DETAIL ON] depends on the setting of the FTP server on the host computer.

### MOVE FOLDER

A folder can be moved.

1. By using cursor keys 
2. Press the MDI key INPUT.

### CREATE FOLDER

A new folder can be created.

1. Move to a new folder to be created.
2. Enter a desired folder name.
3. Press soft key [CREATE FOLDER].

### DELETE

A file or folder can be deleted.

1. By using cursor keys 
2. Press soft key [DELETE].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.
DELETE (multiple files)

Multiple files can be deleted at a time.

1. Press soft key [SELECT START].
2. By using cursor keys \[\downarrow\] \[\uparrow\], select a file to be deleted.
3. Press soft key [SELECT].
   A selected file is displayed in reverse video. 
   Repeat steps 2 and 3 for files to be deleted.
4. Press soft key [DELETE].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

NOTE
Up to 10 files can be selected at a time.

RENAME

A file or folder can be renamed.

1. By using cursor keys \[\downarrow\] \[\uparrow\], select a file or folder to be renamed.
2. Key a new file name or folder name.
3. Press soft key [RENAME].

SEARCH

In the current work folder, a file can be found.

1. Enter a desired file name.
2. Press soft key [SEARCH].

HOST CHANGE

The connected host computer can be changed.

1. Press soft key [HOST CHANGE].
   The connected host number changes in the order 1 → 2 → 3 → 1.
1.3.2 File Transfer Operation

Files can be transferred from the host computer to the Data Server.

**NOTE**
If an error occurs, check the cause of the error according to the Item, “ETHERNET LOG screen” in Section 2.1, "ETHERNET LOG" in Part VI, “MAINTENANCE.”

---

**GET**

An NC program can be transferred from the host computer to the Data Server.

1. By using cursor keys, select a file to be transferred.
2. Press soft key [GET].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.
3. When a file is to be transferred to the Data Server under a different file name, enter the desired transfer destination file name before pressing soft key [GET].

**NOTE**
1. Files cannot sometimes be transferred depending on the operation status and protection status.
2. Use this operation only for text format NC programs.

---

**MGET**

Multiple NC programs can be transferred from the host computer to the Data Server.

1. Enter the names of files to be transferred. File names can be specified using wildcards (*,?).
2. Press soft key [MGET].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

**NOTE**
1. Files cannot sometimes be transferred depending on the operation status and protection status.
2. Use this operation only for text format NC programs.
BGET

A file can be transferred from the host computer to the Data Server.

1. By using cursor keys [↓][↑], select a file to be transferred.
2. Press soft key [BGET].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.
3. When a file is to be transferred to the Data Server under a different file name, enter the desired transfer destination file name before pressing soft key [BGET].

NOTE
1. Files cannot sometimes be transferred depending on the operation status and protection status.
2. When transferring binary format NC programs and NC data such as tool offset data, be sure to use the binary format.

LIST-GET

Multiple files can be transferred from the host computer to the Data Server according to a list file.

1. By using cursor keys [↓][↑], select a list file.
2. Press soft key [LIST-GET].
   - Press soft key [EXEC] for execution.
   - Press soft key [CANCEL] for cancellation.

When execution is selected, the files are transferred from the host computer to the Data Server according to the list file.

NOTE
Files cannot sometimes be transferred depending on the operation status and protection status.
1.3.3 Preparations for File Operation

M198 OPE

A folder for M198-based subprogram calling can be specified.

1. Move to the folder containing a file to be called by M198-based subprogram calling.
2. Press soft key [M198 SET].

**NOTE**
1. No file may be able to be selected, depending on the status such as operation state or protection state.
2. This setting is valid when the operating mode of the Data Server is the FTP mode or buffer mode.

DNC OPE

A file used for DNC operation can be selected.

1. Move to the folder containing a file to be used for DNC operation.
2. By using cursor keys \[\downarrow\uparrow\], select a file to be used for DNC operation.
3. Press soft key [DNC SET].

**NOTE**
1. No file may be able to be selected, depending on the status such as operation state or protection state.
2. This setting is valid when the operating mode of the Data Server is the FTP mode or buffer mode.
1.4 M198-BASED SUBPROGRAM CALL

If the Data Server is placed in the storage mode, an M198-based subprogram call can be made using an NC program in the Data Server. If the Data Server is placed in the FTP mode, an M198-based subprogram call can be made using an NC program in the host computer. If the Data Server is placed in the buffer mode, an M198-based subprogram call can be made using an NC program of the buffer mode format in the host computer.

**NOTE**

1. An M198-based subprogram call cannot be executed simultaneously with NC program input, NC program output, and DNC operation.
2. In an M198-based subprogram call, no additional M198-based subprogram call can be made.
3. M198-based subprogram calls do not allow use of file names. Use a program number to make an M198-based call.

**Subprogram call in the storage mode**

**Procedure**

1. Check that the Data Server is placed in the storage mode.
2. Set the CNC to the MEM mode.
3. Display the DATA SERVER FILE LIST screen to check that an M198 operation folder is set.
4. Automatically operate the NC program including the M198 command.

**Subprogram call in the FTP mode**

**Procedure**

1. Check that the Data Server is placed in the FTP mode.
2. Set the CNC to the MEM mode.
3. Display the DATA SERVER HOST FILE LIST screen to check that an M198 operation folder is set.
4. Automatically operate the NC program including the M198 command.
Subprogram call in the buffer mode

Procedure

1. Check that the Data Server is placed in the buffer mode.
2. Set the CNC to the MEM mode.
3. Display the DATA SERVER HOST FILE LIST screen to check that an M198 operation folder is set.
4. Automatically operate the NC program including the M198 command.
1.5 DNC OPERATION

If the Data Server is placed in the storage mode, DNC operation can be performed using an NC program in the Data Server. If the Data Server is placed in the FTP mode, DNC operation can be performed using an NC program in the host computer. If the Data Server is placed in the buffer mode, DNC operation can be performed using an NC program of the buffer mode format in the host computer.

NOTE
A DNC operation cannot be executed simultaneously with NC program input, NC program output, and M198-based subprogram call.

DNC operation in the storage mode

Procedure
1. Check that the Data Server is placed in the storage mode.
2. Set the CNC to the RMT mode.
3. Display the DATA SERVER FILE LIST screen to check that a DNC operation file is set.
4. Perform a cycle start to execute DNC operation.

DNC operation in the FTP mode

Procedure
1. Check that the Data Server is placed in the FTP mode.
2. Set the CNC to the RMT mode.
3. Display the DATA SERVER HOST FILE LIST screen to check that a DNC operation file is set.
4. Perform a cycle start to execute DNC operation.

DNC operation in the buffer mode

Procedure
1. Check that the Data Server is placed in the buffer mode.
2. Set the CNC to the RMT mode.
3. Display the DATA SERVER HOST FILE LIST screen to check that a DNC operation file is set.
4. Perform a cycle start to execute DNC operation.
1.6 NC PROGRAM INPUT

When the Data Server mode is the storage mode, NC programs on the Data Server can be input to part program storage of the CNC.
When the Data Server mode is the FTP mode, NC programs on the host computer can be input to part program storage of the CNC.
When the Data Server mode is the buffer mode, buffer mode format NC programs on the host computer can be input to part program storage of the CNC.

⚠️ CAUTION ⚠️
If bit 2 of NC parameter No. 3201 is set to 1, when an NC program having the same file name as an NC program to be input is already present in part program storage, the existing NC program is overwritten.

NOTE
NC programs cannot be input simultaneously with an NC program output, M198-based subprogram call, and DNC operation.

Procedure

1. Place the CNC in the EDIT mode.
2. Display the PROGRAM screen or PROGRAM FOLDER screen.
3. Press soft key [READ].
4. In the key-in buffer, enter the name of a file to be read on the Data Server, and press soft key [F SET].
   When the file name on the Data Server is not set, file name "ALL-PROG.TXT" is used by default.
5. To rename the read file and read it into part program storage, enter the new file name in the key-in buffer, and press soft key [P SET].
6. Press soft key [EXEC].
7. During reading, "INPUT" blinks in the lower right part of the screen.

NOTE
In the buffer mode, a file specified with soft key [F SET] is treated as a file list. Therefore, NC program input processing is performed on the assumption that files defined in the file list are a continuous file image.
1.7 NC PROGRAM OUTPUT

When the Data Server mode is the storage mode or buffer mode, NC programs in part program storage of the CNC can be output to the Data Server.
When the Data Server mode is the FTP mode, NC programs in part program storage of the CNC can be output to the host computer.

NOTE
NC programs cannot be output simultaneously with an NC program input, M198-based subprogram call, and DNC operation.

Procedure

1. Place the CNC in the EDIT mode.
2. Display the PROGRAM screen or PROGRAM FOLDER screen.
3. Press soft key [PUNCH].
4. In the key-in buffer, enter the name of a file to be output in part program storage, and press soft key [P SET].
   When a specific file name in part program storage is not set, all files in the foreground folder are assumed to be output.
5. To rename the output file and output it to the Data Server, enter the new file name in the key-in buffer, and press soft key [F SET].
   When only a file in part program storage is specified, but no file name on the Data Server is specified, a file is created with the file name used in part program storage.
6. Press soft key [EXEC].
7. During punching, "OUTPUT" blinks in the lower right part of the screen.

NOTE
1. When neither file in part program storage nor file name on the Data Server is specified, all files in the foreground folder are output with file name "ALL-PROG.TXT" to the Data Server.
2. When an NC program is output in the storage mode or buffer mode, if a file with the same name is already present on the memory card of the Data Server, an error occurs.
1.8 FTP SERVER FUNCTIONS

The FTP server functions allow communication with FTP clients on the host computer.

NOTE
1. Up to five FTP clients can be connected to the FTP server. Some FTP client software products may attempt to internally connect the FTP server as two or more FTP clients, however. For this reason, the number of FTP clients actually connected may differ from that of FTP client applications that can be connected.

2. On the memory card on the Data Server, text files and binary files are distinguished from each other. You can specify text (ASCII) or binary (image) when transferring a file from the FTP client to use the file as a text or binary file.
This chapter describes how to operate the machine remote diagnosis functions.
2.1 OPERATING THE MACHINE REMOTE DIAGNOSIS SCREEN

Procedure

1. Press the function key [SYSTEM].
2. Soft key [REMOTE DIAG] appears. (When there is no soft keys, press the continue key.)
3. Press soft key [REMOTE DIAG] to display the machine remote diagnosis screen.

Machine remote diagnosis screen

4. Press soft key [(OPRT)] to display available soft keys.
<table>
<thead>
<tr>
<th>Display item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INQUIRY NUMBER</strong></td>
<td>Displays the inquiry number indicating the machine remote diagnosis accepting server: &quot;INQUIRY 1,&quot; &quot;INQUIRY2,&quot; or &quot;INQUIRY3.&quot;</td>
</tr>
<tr>
<td><strong>INQUIRY</strong></td>
<td>Displays information for identifying the machine remote diagnosis accepting server.</td>
</tr>
<tr>
<td><strong>RMT DIAG STATUS</strong></td>
<td>Displays the status of machine remote diagnosis.</td>
</tr>
<tr>
<td><strong>RMT DIAG TIME</strong></td>
<td>Displays the time until the machine remote diagnosis status changes from &quot;OPEN&quot; to &quot;CLOSE,&quot; &quot;FORCE CLOSING,&quot; or &quot;ERROR.&quot; At each start of diagnosis, the time is accumulated from &quot;00:00:00.&quot;</td>
</tr>
<tr>
<td><strong>RECEIPT NUMBER</strong></td>
<td>Displays the receipt number issued by the machine remote diagnosis accepting server.</td>
</tr>
<tr>
<td><strong>ERROR NUMBER</strong></td>
<td>Displays the number of an error which occurs in operation of the machine remote diagnosis functions.</td>
</tr>
<tr>
<td><strong>AVAILABLE DEVICE</strong></td>
<td>Displays the type of communication device for which the machine remote diagnosis functions can operate.</td>
</tr>
<tr>
<td><strong>ERROR MESSAGE</strong></td>
<td>Displays the message indicating an error which occurs in operation of the machine remote diagnosis functions.</td>
</tr>
</tbody>
</table>

**Operation list**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIAG OPEN</strong></td>
<td>Starts machine remote diagnosis.</td>
</tr>
<tr>
<td><strong>DIAG CLOSE</strong></td>
<td>Forcibly terminates machine remote diagnosis.</td>
</tr>
<tr>
<td><strong>INQUIRY1</strong></td>
<td>Selects inquiry destination 1.</td>
</tr>
<tr>
<td><strong>INQUIRY2</strong></td>
<td>Selects inquiry destination 2.</td>
</tr>
<tr>
<td><strong>INQUIRY3</strong></td>
<td>Selects inquiry destination 3.</td>
</tr>
</tbody>
</table>
2.1.1 Selecting an Inquiry Destination

Select an inquiry destination among inquiry destinations 1 to 3.

1. Press soft key [(OPRT)].

2.1.2 Starting Diagnosis

Start diagnosis.

1. Press soft key [(OPRT)].
2. Press soft key [DIAG OPEN] to start diagnosis.

2.1.2.1 Diagnosis status

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>No operation</td>
</tr>
<tr>
<td>OPEN</td>
<td>[DIAG OPEN] was pressed.</td>
</tr>
<tr>
<td>OPENING</td>
<td>An attempt is being made to connect the machine remote diagnosis accepting server.</td>
</tr>
<tr>
<td>ACCEPTED</td>
<td>The machine remote diagnosis accepting server accepted diagnosis.</td>
</tr>
<tr>
<td>REFUSED</td>
<td>The machine remote diagnosis accepting server rejected diagnosis.</td>
</tr>
<tr>
<td>DIAGNOSING</td>
<td>This message flashes in synchronization with data flowing on the communication line.</td>
</tr>
<tr>
<td>CLOSE</td>
<td>The machine remote diagnosis accepting server terminated diagnosis.</td>
</tr>
<tr>
<td>FORCE CLOSING</td>
<td>[DIAG CLOSE] was pressed. After the completion of forced termination processing, &quot;---&quot; is indicated in the RMT DIAG STATUS field.</td>
</tr>
<tr>
<td>ERROR</td>
<td>An error occurred on the communication line.</td>
</tr>
</tbody>
</table>
### 2.1.2.2 Error numbers and error messages

<table>
<thead>
<tr>
<th>Number</th>
<th>Error message</th>
<th>Meaning and action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diagnosis is busy</td>
<td>[DIAG OPEN] was pressed during diagnosis.</td>
</tr>
<tr>
<td>2</td>
<td>Router isn't alive</td>
<td>The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.</td>
</tr>
<tr>
<td>3</td>
<td>Receipt Server isn't alive</td>
<td>The IP address of the machine remote diagnosis accepting server may be invalid or the power to the machine remote diagnosis accepting server may be off. Check whether the IP address of the machine remote diagnosis accepting server is valid and whether the power to the machine remote diagnosis accepting server is on.</td>
</tr>
<tr>
<td>4</td>
<td>System error</td>
<td>A system error occurred. Check the log messages on the ETHERNET LOG screen and contact FANUC.</td>
</tr>
<tr>
<td>5</td>
<td>Invalid Inquiry number</td>
<td>A value outside the valid setting range may be set for the inquiry destination. Check whether the correct inquiry destination is set.</td>
</tr>
<tr>
<td>6</td>
<td>Invalid IP Address</td>
<td>Set the IP address according to the IP address specification format.</td>
</tr>
<tr>
<td>7</td>
<td>Invalid PORT number</td>
<td>A value outside the valid setting range may be set for the port number. Check whether the correct port number is set.</td>
</tr>
<tr>
<td>8</td>
<td>Invalid Router IP Address</td>
<td>Set the IP address of the router according to the IP address specification format.</td>
</tr>
<tr>
<td>9</td>
<td>Socket error</td>
<td>A communication error occurred due to a cause as listed below. Check the network wiring and anti-noise measures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ The software component on the personal computer with which to communicate forcibly disconnected the logical communication path.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ The Ethernet cable was disconnected.</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Invalid Request</td>
<td>An internal error related to machine remote diagnosis occurred in the CNC. Check the log messages on the ETHERNET LOG screen and contact FANUC.</td>
</tr>
<tr>
<td>12</td>
<td>Invalid Packet</td>
<td>An unrecognizable packet was received. Check the log messages on the ETHERNET LOG screen and contact FANUC.</td>
</tr>
<tr>
<td>13</td>
<td>Diagnosis was already stopped</td>
<td>[DIAG CLOSE] was pressed not during diagnosis.</td>
</tr>
<tr>
<td>17</td>
<td>Receive error</td>
<td>An attempt to receive data failed. See Number 9 and check the network wiring and anti-noise measures.</td>
</tr>
<tr>
<td>19</td>
<td>HeartBeat timeout</td>
<td>Communication with the machine remote diagnosis accepting server stopped. See Number 9 and check the network wiring and anti-noise measures.</td>
</tr>
<tr>
<td>20</td>
<td>HeartBeat error</td>
<td>An attempt was failed to send a heartbeat packet for machine remote diagnosis. See Number 9 and check the network wiring and anti-noise measures.</td>
</tr>
<tr>
<td>22</td>
<td>DNS error</td>
<td>An attempt was failed to connect the machine remote diagnosis accepting server using the DNS function. The IP address of the DNS server may be invalid or the power to the DNS server may be off. Check whether the IP address of the DNS server is valid and whether the power to the DNS server is on.</td>
</tr>
</tbody>
</table>

### 2.1.3 Forcibly Terminating Diagnosis

Forcibly terminate diagnosis.

1. Press soft key [(OPRT)].
2. Press soft key [DIAG CLOSE] to forcibly terminate diagnosis.
V. CONNECTION
1 SETTING

This chapter provides information required to install the FAST Ethernet/FAST Data Server.
1.1 SPECIFICATIONS

This section describes the hardware specifications of the FAST Ethernet/FAST Data Server.

<table>
<thead>
<tr>
<th>Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordering information</td>
<td>A02B-0303-J146</td>
</tr>
<tr>
<td>Board drawing number</td>
<td>A20B-8101-0030</td>
</tr>
<tr>
<td>Applicable model</td>
<td></td>
</tr>
<tr>
<td>FANUC Series 30i/300i/300is- MODEL A</td>
<td></td>
</tr>
<tr>
<td>FANUC Series 31i/310i/310is- MODEL A</td>
<td></td>
</tr>
<tr>
<td>FANUC Series 31i/310i/310is- MODEL A5</td>
<td></td>
</tr>
<tr>
<td>FANUC Series 32i/320i/320is- MODEL A</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**

1. When using a board, observe the installation condition (environmental condition inside the cabinet) of the CNC control unit where the board is installed.

2. Even if a control unit is installed in the environment described above, the contents on the memory card may be destroyed as a result of an operation mistake or unexpected event. This tends to happen if the power is turned off while accessing the memory card. An accident can occur. So, ensure that the data on the memory card is backed up at all times.

The table below indicates the amount of heat output by the FAST Ethernet/FAST Data Server. For the amount of heat output by the main CNC unit and other optional units, refer to the CONNECTION MANUAL (HARDWARE) of the CNC.

<table>
<thead>
<tr>
<th></th>
<th>FAST Ethernet</th>
<th>FAST Data Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single board unit</td>
<td>6 W</td>
<td>6 W (Note)</td>
</tr>
<tr>
<td>Memory card</td>
<td>-</td>
<td>0.3 W (Note)</td>
</tr>
<tr>
<td>Total</td>
<td>6 W</td>
<td>6.3 W</td>
</tr>
</tbody>
</table>

**NOTE**

The amount of heat output by the memory card may vary, depending on the employment of a large-capacity card, a modification to the card specifications, and so forth.
1.2 INSTALLATION

This section provides information relating to the installation of the FAST Ethernet and FAST Data Server.

1.2.1 Installation on an LCD-mounted Type Unit

The board is installed in an optional slot of the control unit. It occupies one slot. No restriction is imposed on installation in the optional slot.

NOTE

1. When using the Data Server functions, install a memory card in CNH6 before installing the board in the optional slot. While the board is installed in the optional slot, the memory card cannot be installed/removed.

2. Use the memory card recommended by FANUC.
1.2.2 Installation on a Stand-alone Type Unit

The board is installed in the optional slot of the control unit. One slot is occupied. No restriction is imposed on installation in the optional slot.

NOTE
1. When using the Data Server functions, install a memory card in CNH6 before installing the board in the optional slot. While the board is installed in the optional slot, the memory card cannot be installed/removed.
2. Use the memory card recommended by FANUC.
1.2.3  Total Connection Diagram

- CD38R
  1. TX+
  2. TX-
  3. RX+
  4. 
  5. 
  6. RX-
  7. 
  8. 

- FAST Ethernet/
  FAST Data Server

- Memory card

- CNH6

- HUB
1.2.4 Installing a Memory Card

The following shows the specifications of memory cards recommended as an external storage device of the FAST Data Server.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Capacity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A02B-0281-K601</td>
<td>128MB</td>
<td>CompactFlash card</td>
</tr>
<tr>
<td>A02B-0213-K211</td>
<td>256MB</td>
<td>CompactFlash card</td>
</tr>
<tr>
<td>A02B-0213-K212</td>
<td>1GB</td>
<td>CompactFlash card</td>
</tr>
</tbody>
</table>

Generally, because of characteristics of the internal flash memory, repeatedly reading data from a CompactFlash card can degrade internal data and result in a data error. Even if such a problem arises, the CompactFlash cards listed above have a function for restoring data automatically, so incorrect data will not be read from these cards. However, a read operation may take a time temporarily. The delay in read time is related to memory operation performance (speed) and finish on machined surfaces. So, this should be taken into consideration when these cards are used. For memory operation, these cards should be used with the processing time per block set to 24 ms or longer. For DNC operation, a sufficient buffer is provided between the Data Server and the CNC, so there is no influence on machining even if the delay mentioned above is generated in read operation.

Operation checks have been conducted for SanDisk's adapter (SDAD-38-J60) that converts the above CompactFlash cards to an ATA card.

**NOTE**
For latest information, refer to the Technical Report provided separately.
Installing a memory card

<1> Remove the screws of (1) and (2) for securing the stopper plate.

<2> Remove the stopper plate of (3), then insert the memory card into the connector.

<3> Secure the memory card with the stopper plate, then tighten the screws of (4) and (5).
2. CABLE CONNECTION

This section describes information relating to the physical Ethernet connection.

⚠️ CAUTION

1. Before connecting or disconnecting the cable to or from the FAST Ethernet/FAST Data Server, make sure that the power to the CNC is turned off.
2. Please inquire of each manufacturer about the construction of network or the condition of using the equipment except the FAST Ethernet/FAST Data Server (hub, transceiver, cable etc.). When configuring your network, you must take other sources of electrical noise into consideration to prevent your network from being influenced by electrical noise. Make sure that network wiring is sufficiently separated from power lines and other sources of electrical noise such as motors, and ground each of the devices as necessary. Also, a high and insufficient ground impedance may cause interference during communications. After installing the machine, conduct a communications test before you actually start operating the machine. We cannot ensure operation that is influenced by network trouble caused by a device other than the FAST Ethernet or FAST Data Server.
2.1 CONNECTING TO Ethernet

The FAST Ethernet or FAST Data Server is provided with a 100BASE-TX interface. Prepare a hub for connecting the FAST Ethernet board to the Ethernet trunk. The following shows an example of a general connection.

Some devices (hub, transceiver, etc.) that are needed for building a network do not come in a dust-proof construction. Using such devices in an atmosphere where they are subjected to dust or oil mist will interfere with communications or damage the FAST Ethernet or FAST Data Server. Be sure to install such devices in a dust-proof cabinet.
2.2 LEADING OUT THE Ethernet CABLE

(1) LCD-mounted type
For this type of control unit, the cable is led out from the side of the control unit. See the outline drawing of the board for the location of the connector.

![Diagram of LCD-mounted type](image1)

The radius of the cable must be 70 mm or more.

(2) Stand-alone type
For this type of control unit, the cable is drawn out only from the front of the control unit. See the outline drawing of each type of board for the location of the connector.

![Diagram of Stand-alone type](image2)

The Ethernet cable must be fastened by a cable clamp to prevent tension being applied to the modular connector (RJ-45) that connects the cable to the control unit even if the Ethernet cable is pulled directly. This clamp is also used to ground the cable shield.
### 2.3 100BASE-TX CONNECTOR (CD38R) PIN ASSIGNMENTS

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TX+</td>
<td>Send +</td>
</tr>
<tr>
<td>2</td>
<td>TX-</td>
<td>Send -</td>
</tr>
<tr>
<td>3</td>
<td>RX+</td>
<td>Receive +</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Not used</td>
</tr>
<tr>
<td>6</td>
<td>RX-</td>
<td>Receive -</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Not used</td>
</tr>
</tbody>
</table>
2.4 TWISTED-PAIR CABLE SPECIFICATION

2.4.1 Cable Connection

The cable used for connection between the 100BASE-TX interface, CD38R, of the Ethernet board/Data Server board and the hub is connected as follows:

- Keep the total cable length within 100 m.
- Do not extend the cable more than is necessary.
- The figure above shows the cable connection when cables are crossed in the hub.
  "X" is usually indicated at the port of the hub to signify that cables are crossed in the hub.
2.4.2 Cable Materials

⚠️ **CAUTION**
Unshielded cable (UTP cable) is commercially available as 100BASE-TX twisted-pair cable: You should, however, use shielded Category 5 twisted-pair cable (STP cable) to improve the resistance to electrical noise in an FA environment.

### Recommended Cables

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Specification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>FURUKAWA ELECTRIC CO., LTD.</td>
<td>DTS5087C-4P</td>
<td>Twisted-pair cable</td>
</tr>
<tr>
<td>NISSEI ELECTRIC CO., LTD.</td>
<td>F-4PFWMF</td>
<td>Single-conductor cable</td>
</tr>
</tbody>
</table>

### Inquiries

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Contact address</th>
</tr>
</thead>
<tbody>
<tr>
<td>FURUKAWA ELECTRIC CO., LTD.</td>
<td>2-6-1 Marunouchi, Chiyoda-ku. Tokyo 100-8322 TEL: 03-3286-3126 FAX: 03-3286-3979</td>
</tr>
<tr>
<td>Sales Headquarters</td>
<td></td>
</tr>
<tr>
<td>NISSEI ELECTRIC CO., LTD.</td>
<td>3F MU Bldg., 1-9-1 Minami-narise, Machida City, Tokyo 194-0045 TEL: 0427-29-2531 FAX: 0427-29-3375</td>
</tr>
<tr>
<td>Machida Branch</td>
<td></td>
</tr>
<tr>
<td>Overseas Sales Office</td>
<td>IWATANI International Corporation Tokyo Head Office 21-8 Nishi-shinbash 3-chome, Minato-ku, TOKYO, 105-8458, JAPAN TEL: 03-5405-5810 FAX: 03-5405-5666 Telex: 2524256 IWATYO J</td>
</tr>
</tbody>
</table>

### Remarks
A finished cable with connectors at both ends can be offered.

**NOTE**
The recommended cables cannot be connected to moving parts.
Recommended cable (for movable parts)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Specification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oki Electric Cable Co., Ltd.</td>
<td>AWG26 4P TPMC-C5-F(SB)</td>
<td>Dedicated to FANUC</td>
</tr>
<tr>
<td>Shinko Electric Industrial Co., Ltd.</td>
<td>FNC-118</td>
<td></td>
</tr>
</tbody>
</table>

Specification

- Electric characteristics:
  Conforms to EIA/TIA 568A Category 3 and Category 5.
  From the viewpoint of attenuation performance, ensure that the length to the hub is 50 m or less.

- Structure:
  Group shielded (braided shield). A drain wire is available.
  The conductor is an AWG26 annealed copper twisted wire, with a sheath thickness of 0.8 mm and an outer diameter of 6.7 mm ±0.3 mm.

- Fire retardancy
  UL1581 VW-1

- Oil resistance
  Conforms to the FANUC internal standards (equivalent to the conventional oil-resistant electric cables).

- Flexing resistance:
  1,000,000 times or more with a bending radius of 50 mm (U-shaped flex test)

- UL style No.
  AWM 20276 (80°C/30V/VW-1)

**NOTE**

Be sure to use the connector TM21CP-88P(03) manufactured by HIROSE ELECTRIC CO., LTD. for this cable.

Inquiries

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Contact address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oki Electric Cable Co., Ltd.</td>
<td>Nagano Sales Office TEL:0266-27-1597</td>
</tr>
<tr>
<td>Shinko Electric Industrial Co., Ltd.</td>
<td>Tokyo Sales Office TEL:03-3492-0073</td>
</tr>
</tbody>
</table>

Cable assembly

Oki Electric Cable Co., Ltd. can also supply the cable assembly mentioned above.
Contact Oki Electric directly to determine the specifications (length, factory test, packing, and so forth) for purchase.
2.4.3 Connector Specification

Use an 8-pin modular connector (RJ-45) with the twisted-pair cable for the Ethernet connection. The following connectors or equivalents must be used.

<table>
<thead>
<tr>
<th>For general use</th>
<th>Specification</th>
<th>Manufacturer</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid wire</td>
<td>5-569530-3</td>
<td>Tyco Electronics AMP K.K.</td>
<td></td>
</tr>
<tr>
<td>Solid wire</td>
<td>MS8-RS25-EMC</td>
<td>SK KOHKI CO., LTD.</td>
<td>Special tools required</td>
</tr>
<tr>
<td>Twisted-pair cable</td>
<td>5-569552-3</td>
<td>Tyco Electronics AMP K.K.</td>
<td></td>
</tr>
<tr>
<td>Twisted-pair cable</td>
<td>TM11AP-88P</td>
<td>HIROSE ELECTRIC CO., LTD.</td>
<td>Special tools required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For movable parts</th>
<th>Specification</th>
<th>Manufacturer</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>For cable AWG26 4P TPMC-C5-F(SB) or FNC-118</td>
<td>TM21CP-88P(03)</td>
<td>HIROSE ELECTRIC CO., LTD.</td>
<td>Note</td>
</tr>
</tbody>
</table>

**NOTE**

Information about TM21CP-88P(03):
Connector (standard product of the manufacturer)
Drawing number: A63L-0001-0823#P
Manufacturer: HIROSE ELECTRIC CO., LTD.
Manufacturer type number: TM21CP-88P(03)
Conforms to EIA/TIA 568A Category 3 and Category 5.
For assembly with a cable, contact HIROSE ELECTRIC CO., LTD. directly.
(From HIROSE ELECTRIC CO., LTD., "TM21CP-88P(03) Connection Procedure Manual (Technical Specification No. ATAD-E2367)" is available as a technical document.)
2.5 ELECTRICAL NOISE COUNTERMEASURES

2.5.1 Separating Signal Lines

For signal line separation, refer to the description of noise protection in the Connection Manual (Hardware) (B-63943EN) of CNC. The wiring for the Ethernet cable is of group C.

2.5.2 Clamping and Shielding Cables

Clamp an Ethernet twisted pair cable according to the method described below, as with cables that need to be shielded. Clamping cables provides support and shielding and is extremely important to the safe operation of the system. Never overlook cable clamping.

Peel off part of the jacket as shown in the figure to expose the outer coating of the shield, and press this outer coating against the ground plate with the clamp fixture.

The machine manufacturer must prepare the ground plate and install it as follows:

NOTE
To ensure the safe operation of the system, clamp and shield the cables.

Connect the Ethernet board and hub with a twisted-pair cable. Shield the cable with clamp fixtures.
This shielding is extremely important to the stable operation of the system. Be sure to shield the cable. Shield both ends of each cable at locations as nearest to the CNC and hub connectors as possible. When the CNC and hub are contained in the same power magnetics cabinet and the cable is short, shield the cable only at the hub side.

![Diagram of shielding](image)

Example of shielding of transceiver cable
(When LCD-mounted type Series 30i-A)

Prepare the following earth plate.
Use a nickel-plated iron plate at least 2 mm thick as the ground plate.

Details of clamp fixture mounting holes

External dimensions of clamp fixture
2.5.3 Grounding the Network

Even if the grounding condition on the machine side is satisfied, the communication line can pick up noise from the machine, depending on the machine installation condition and environment, thus resulting in a communication error. To protect against such noise, the machine should be separated and insulated from the Ethernet trunk cable and personal computer. Examples of connection are given below.

Large-Scale Network

Small-Scale Network
**NOTE**

1. The ground between PC/HUB side and machine system side must be separated. If it is impossible to separate the ground because there is only one grounding point, connect the ground cable for each system to the grounding point independently. (See figure below.) The resistance for grounding must be less than 100-ohm (Class D). The thickness of the ground cable is the same as the thickness of AC power cable or more. At least thickness of 5.5mm² is necessary.

2. Note that the number of allowable hub-to-hub connections depends on the type of hub.

3. There is possibility that noise makes the obstacle of communication even if the ground is separated using the 100BASE-TX. In the case of using the FAST Ethernet/FAST Data Server under the worst environment, please separate between the PC/Trunk line side and machine system side completely using the 100BASE-FX (Optical fiber media).

![Diagram showing grounding connections](image)

**Wiring on a single ground point**
### 2.6 CHECK ITEMS AT INSTALLATION

The following table lists check items at installation.

<table>
<thead>
<tr>
<th>Check item</th>
<th>Description</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet cable</td>
<td>Use cables which satisfies all the following conditions: 1) With shielding 2) Twisted-pair cable 3) Category 5</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Length</td>
<td>The cable length shall be within 100 m (50 m for a movable cable recommended by FANUC).</td>
</tr>
<tr>
<td>Connection</td>
<td>The Ethernet cables shall be bound separately from the following cables or covered with an electromagnetic shield: 1) Group A: AC power lines, power lines for motors, and others 2) Group B: Current DC (24 VDC) and others</td>
<td></td>
</tr>
<tr>
<td>Separation</td>
<td>Shielding</td>
<td>For a shielded cable, the part of which outer coating is peeled off and exposed shall be fixed to the ground plate with a clamp fixture.</td>
</tr>
<tr>
<td>Clamping</td>
<td>The ground plate shall be located as nearest to the CNC as possible (to make the cable between the ground plate and CNC hard to be affected by noise).</td>
<td></td>
</tr>
<tr>
<td>Connectors</td>
<td>Wiring</td>
<td>No cable shall be laid under a heavy object.</td>
</tr>
<tr>
<td>Bending radius</td>
<td>Any cable connector shall not be pulled (to prevent poor contact of the connector).</td>
<td></td>
</tr>
<tr>
<td>For movable part</td>
<td></td>
<td>For a movable part, a cable for a movable part shall be used.</td>
</tr>
<tr>
<td>CNC and cabinet</td>
<td>CNC grounding</td>
<td>The CNC ground (frame ground) shall be connected properly and the length of the ground wire shall be within 300 mm.</td>
</tr>
<tr>
<td></td>
<td>Ground plate</td>
<td>The ground plate shall be connected to the AC ground of the cabinet with wire.</td>
</tr>
<tr>
<td></td>
<td>Mounting</td>
<td>The Ethernet board shall be inserted in a CNC slot properly.</td>
</tr>
<tr>
<td>HUB</td>
<td>Use conditions</td>
<td>The “cautions on use” of the hub shall be observed (A terminating resistor shall be mounted properly if required).</td>
</tr>
<tr>
<td></td>
<td>Grounding</td>
<td>The hub shall be grounded.</td>
</tr>
<tr>
<td></td>
<td>Cabinet</td>
<td>The hub shall be installed in an enclosed cabinet.</td>
</tr>
<tr>
<td></td>
<td>Vibration</td>
<td>The hub shall be installed so that it is not affected by vibration.</td>
</tr>
<tr>
<td></td>
<td>Bending radius</td>
<td>The bending radius shall be at least four times as long as the diameter of the cable.</td>
</tr>
</tbody>
</table>
VI. MAINTENANCE
This chapter provides hardware maintenance information related to the FAST Ethernet/FAST Data Server.
1.1 BOARD

This section describes the maintenance information for the FAST Ethernet board / FAST Data Server board.

1.1.1 Component Layout

<table>
<thead>
<tr>
<th>Name</th>
<th>PCB drawing No.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAST Ethernet board / FAST Data Server board</td>
<td>A20B-8101-0030</td>
<td></td>
</tr>
</tbody>
</table>
1.1.2 LED Indications and Meanings

The board provides four green LEDs (STATUS) and one red LED (ALARM) for status indication, and provides three green LEDs and one red LED for communication status indication. The figure below shows the locations of these LEDs. The table below explains the LED lighting states.

In the following explanations, the LED lighting states are expressed as follows:

□: Off  ■: On  ⋆: Blinking  ◊: Don't care

NOTE
The face plate is indicated using dotted lines.
**LED display transition for LED1, LED2, LED3, and LED4 (during power-on)**

<table>
<thead>
<tr>
<th>LED indication</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>L4 L3 L2 L1</td>
<td>Power-off</td>
<td>Initial state entered immediately after power-on. If the board is stopped in this condition, the cause is one of the following: → The firmware is not stored in the Flash ROM of the CNC. → The board is defective.</td>
</tr>
<tr>
<td>L4 L3 L2 L1</td>
<td>Immediately after power-on</td>
<td>The board has started. If the board is stopped in this condition, the board may be defective.</td>
</tr>
<tr>
<td>L4 L3 L2 L1</td>
<td>Start of board</td>
<td>The firmware has been downloaded to the board. If the board is stopped in this condition, the board may be defective.</td>
</tr>
<tr>
<td>L4 L3 L2 L1</td>
<td>Completion of firmware downloading</td>
<td>The firmware OS has started. If the board is stopped in this condition, the cause is one of the following: → The firmware stored in the Flash ROM of the CNC is destroyed. → The board is defective.</td>
</tr>
<tr>
<td>L4 L3 L2 L1</td>
<td>Firmware OS started.</td>
<td>Initialization of the firmware OS is completed. If the board is stopped in this condition, the cause is one of the following: → The firmware stored in the Flash ROM of the CNC is destroyed. → The board is defective.</td>
</tr>
<tr>
<td>L4 L3 L2 L1</td>
<td>Completion of firmware OS initialization</td>
<td>The Ethernet parameters have been read. If the board is stopped in this condition, the cause is one of the following: → The Ethernet option or Data Server option is not installed. → The IP address or subnet mask is not set.</td>
</tr>
<tr>
<td>L4 L3 L2 L1</td>
<td>Start completion</td>
<td>The board has started normally.</td>
</tr>
</tbody>
</table>

**LED display for LED1, LED2, LED3, and LED4 (during normal operation)**

<table>
<thead>
<tr>
<th>LED indication</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>L4 L3 L2 L1</td>
<td>Normal status</td>
<td>The board is operating normally.</td>
</tr>
</tbody>
</table>

**LED display for BTX, LIL, COM, and ALM (during normal operation)**

<table>
<thead>
<tr>
<th>LED indication</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>BTX</td>
<td>100BASE-TX connection in progress</td>
<td>The communication rate is 100BASE-TX.</td>
</tr>
<tr>
<td>BTX</td>
<td>10BASE-T connection in progress</td>
<td>The communication rate is 10BASE-T.</td>
</tr>
<tr>
<td>LIL</td>
<td>Connected to hub</td>
<td>The board is connected to the hub.</td>
</tr>
<tr>
<td>COM</td>
<td>Transmission/reception in progress</td>
<td>Data is being transmitted or received.</td>
</tr>
<tr>
<td>ALM</td>
<td>No alarm</td>
<td>No alarm is issued</td>
</tr>
</tbody>
</table>
LED display for LED1, LED2, LED3, and LED4 (when abnormality occurs)

The STATUS LEDs are turned on and off repeatedly with long on-time and short on-time.

<table>
<thead>
<tr>
<th>LED indication [Long on-time] 4 3 2 1</th>
<th>LED indication [Short on-time] 4 3 2 1</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>■■■■      ■■■■</td>
<td>Error on another board</td>
<td>A defect on another board or a problem on another board was detected.</td>
<td></td>
</tr>
<tr>
<td>■■■■      ■■■■</td>
<td>Bus error</td>
<td>Software has a problem, or the board is defective.</td>
<td></td>
</tr>
<tr>
<td>■■■■      ■■■■</td>
<td>Parity alarm</td>
<td>The board is defective.</td>
<td></td>
</tr>
<tr>
<td>■■■■      ■■■■</td>
<td>Illegal general instruction</td>
<td>Software has a problem, or the board is defective.</td>
<td></td>
</tr>
<tr>
<td>■■■■      ■■■■</td>
<td>Illegal slot instruction</td>
<td>Software has a problem, or the board is defective.</td>
<td></td>
</tr>
<tr>
<td>■■■■      ■■■■</td>
<td>CPU address error</td>
<td>Software has a problem, or the board is defective.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**

If an error occurs with the LEDs turned on and off with long on-time and short on-time in a manner not indicated above, contact FANUC.

LED display for COL, LIL, and ALM (when abnormality occurs)

<table>
<thead>
<tr>
<th>LED indication</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>COL ■</td>
<td>Collision occurs. (Data collision occurs.)</td>
<td>The LED is on or blinks at short intervals when the Ethernet communication traffic (communication amount) is high or ambient noise is high.</td>
</tr>
<tr>
<td>COL ☆</td>
<td>Not connected to hub</td>
<td>The board is not connected to the hub properly. The LIL LED stays off also when the power to the hub is off. Check whether the board is connected to the hub properly.</td>
</tr>
<tr>
<td>LIL □</td>
<td>Parity error occurs.</td>
<td>A parity error occurred in memory on the board. The board is defective.</td>
</tr>
<tr>
<td>ALM ■</td>
<td>Not connected to hub</td>
<td>The board is defective.</td>
</tr>
</tbody>
</table>
This chapter provides software maintenance information related to the FAST Ethernet/FAST Data Server.
2.1 Ethernet LOG

A log related to the FAST Ethernet/FAST Data Server is displayed.

ETHERNET LOG screen

Procedure

1. Press the function key MESSAGE.
2. Press soft key [BOARD LOG] to display the LOG screen for the FAST Ethernet/FAST Data Server. (If the soft key is not found, press the continuous menu key.)

The latest log information is displayed at the top of the screen. At the right end of a log item, the occurrence date and time of the log item is indicated. Date and time data is indicated in the format "MMM.DD hh:mm:ss", where MMM represents a month, DD represents a day, hh represents hours, mm represents minutes, and ss represents seconds. The top item in the example above indicates "09:36:14 on August 7".

To clear the log information, press soft key [OPRT] then soft key [CLEAR].
By operating the LOG screen of the FAST Ethernet/FAST Data Server, log information can be displayed for each function.

1. Soft key [ALL]
   This soft key displays all log information related to the FAST Ethernet/FAST Data Server.

2. Soft key [COMMON]
   This soft key displays log information related to the parameter setting and basic communication function of the FAST Ethernet/FAST Data Server.

3. Soft key [FOCAS2]
   This soft key displays log information related to the FOCAS2/Ethernet function.

4. Soft key [DATA SERVER]
   This soft key displays log information related to the Data Server.

5. Soft key [REMOTE DIAG]
   This soft key displays log information related to the machine remote diagnosis functions.

**NOTE**

The Ethernet log information is stored in volatile memory and is lost when the power to the CNC is turned off. Check the log information when an error occurs.

<table>
<thead>
<tr>
<th>Error number</th>
<th>Log message</th>
<th>Meaning and action to be taken</th>
</tr>
</thead>
</table>
| E-0118       | Error occurred while wait for FOCAS2 pdu | A communication error occurred due to one of the following causes:  
   → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected.  
   → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path.  
   → The Ethernet cable was disconnected.                                                                                                                                  |
| E-0119       | Error occurred while wait for FOCAS2 pdu | A communication error occurred due to one of the following causes:  
   → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected.  
   → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path.  
   → The Ethernet cable was disconnected.                                                                                                                                  |
<p>| E-011A       | All communication paths are busy      | All FOCAS2/Ethernet communication paths are being used.                                                                                                                                                                           |
| E-0126       | No response from RMT DIAG server      | The IP address of the machine remote diagnosis accepting server may be invalid or the power to the machine remote diagnosis accepting server may be off. Check whether the IP address of the machine remote diagnosis accepting server is valid and whether the power to the machine remote diagnosis accepting server is on. Alternatively, the machine remote diagnosis accepting server may not respond to the PING command to increase the security level (such as a firewall setting). Set bit 1 of CNC parameter No. 905 to “1” and connect the server again. |
| E-012D       | No response from router               | The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.                                                                                     |</p>
<table>
<thead>
<tr>
<th>Error number</th>
<th>Log message</th>
<th>Meaning and action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-0200</td>
<td>(Received message from FTP server)</td>
<td>A message sent from the FTP server is displayed as is. A message containing kanji, hiragana, and/or katakana characters may not be displayed correctly.</td>
</tr>
<tr>
<td>E-0202</td>
<td>Connection failed with FTP server</td>
<td>The FTP server software may not be running. Run the FTP server software. Alternatively, the setting may be made so that the FTP server cannot be connected to increase the security level (such as a firewall setting). Change the firewall setting so that the FTP server can be connected.</td>
</tr>
<tr>
<td>E-0207</td>
<td>The router is not found</td>
<td>The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.</td>
</tr>
<tr>
<td>E-0208</td>
<td>The FTP server is not found</td>
<td>The IP address of the FTP server may be invalid or the power to the FTP server may be off. Check whether the IP address of the FTP server is valid and whether the power to the FTP server is on. Alternatively, the FTP server may not respond to the PING command to increase the security level (such as a firewall setting). Set bit 1 of CNC parameter No. 905 to “1” and connect the server again.</td>
</tr>
<tr>
<td>E-020B</td>
<td>Cannot login into FTP server</td>
<td>Check the user name and password for logging in to the FTP server.</td>
</tr>
<tr>
<td>E-020C</td>
<td>The parameters of FTP server are wrong</td>
<td>Check the user name and password for logging in to the FTP server.</td>
</tr>
<tr>
<td>E-020D</td>
<td>Changing a work folder of host failed</td>
<td>Check the work folder for logging in to the FTP server.</td>
</tr>
<tr>
<td>E-0219</td>
<td>The DNC file is not found</td>
<td>Check whether the file for DNC operation is specified correctly.</td>
</tr>
<tr>
<td>E-021A</td>
<td>The specified file is not found</td>
<td>Check whether the specified file is present.</td>
</tr>
<tr>
<td>E-021B</td>
<td>Opening a file failed</td>
<td>The file could not be opened. Check the error code in parentheses.</td>
</tr>
<tr>
<td>E-021F</td>
<td>FTP transfer is busy on BUFFER mode</td>
<td>FTP communication could not catch up with data supply. Correct the file division size. Alternatively, set bit 0 of NC parameter No. 0904 to 1.</td>
</tr>
<tr>
<td>E-0220</td>
<td>There is no file in list file</td>
<td>No file is defined in the list in the buffer mode. Correct the file list.</td>
</tr>
<tr>
<td>E-0221</td>
<td>The specified file already exists</td>
<td>The specified file is already present on the memory card of the Data Server. Delete the existing file. Alternatively, change the file name.</td>
</tr>
<tr>
<td>E-0223</td>
<td>Writing data to the file failed</td>
<td>Data could not be written to the memory card of the Data Server. Check the error code in parentheses.</td>
</tr>
<tr>
<td>E-023A</td>
<td>The specified file is busy</td>
<td>The file on the memory card of the Data Server is currently used. When a file on the memory card is selected as a main program, the file is regarded as being used.</td>
</tr>
<tr>
<td>E-0252</td>
<td>Contents of ATA card are broken</td>
<td>Format the memory card of the Data Server.</td>
</tr>
<tr>
<td>E-02F0</td>
<td>ATA card is not found</td>
<td>Check whether a memory card is installed in the Data Server.</td>
</tr>
<tr>
<td>E-02F3</td>
<td>ATA card is not mounted</td>
<td>Check whether the memory card of the Data Server is destroyed and whether the memory card has been formatted.</td>
</tr>
<tr>
<td>Error number</td>
<td>Log message</td>
<td>Meaning and action to be taken</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| E-041A      | Frame transmission failed (TCP)   | A communication error occurred due to one of the following causes:  
  - The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected.  
  - The software component on the personal computer with which to communicate forcibly disconnected the logical communication path.  
  - The Ethernet cable was disconnected.  
  - Data cannot be posted to the communication destination due to a firewall setting.                                                                                                                                                                                                                                                                                                                                                         |
| E-0A02      | Cannot read MAC address           | The MAC address may not be written on the FAST Ethernet board or FAST Data Server board or the board may be damaged.                                                                                                                                                                                                                                                                                                                                                                                                     |
| E-0A06      | Network is too busy               | An excessive amount of data flows over the network. Take action such as dividing the network.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| E-0B00      | The own IP address is wrong       | Set the IP address according to the IP address specification format.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| E-0B01      | The own IP address is not set     | Set the IP address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| E-0B02      | Subnet mask is wrong              | Set the subnet mask according to the subnet mask specification format.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| E-0B03      | Subnet mask is not set            | Set the subnet mask.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| E-0B04      | Router IP address is wrong        | There may be a conflict between the classes of the local node and router IP addresses.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| E-0B05      | IP address of DNS server is wrong | There may be a conflict between the classes of the local node and DNS server IP addresses.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| E-0B06      | The own host name is wrong        | Check the host name setting.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| E-0B07      | The own domain name is wrong      | Check the domain name setting.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| E-0B08      | TCP port number is wrong          | A value outside the valid setting range may be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| E-0B09      | UDP port number is wrong          | A value outside the valid setting range may be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| E-0B0B      | IP address of remote FTP server is wrong | Set the IP address according to the IP address specification format.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| E-0B0C      | Port number of a remote FTP server is wrong | A value outside the valid setting range may be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B0D      | User name of remote FTP server is wrong | A character unavailable for a user name may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B0E      | Password of remote FTP server is wrong | A character unavailable for a password may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B0F      | Login folder of remote FTP srv is wrong | A character unavailable for a login folder name may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B10      | Port number of own FTP server is wrong | A value outside the valid setting range may be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B11      | User name of own FTP server is wrong | A character unavailable for a user name may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B12      | Password of own FTP server is wrong | A character unavailable for a password may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B13      | Login folder of own FTP server is wrong | A character unavailable for a login folder name may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B14      | IP address of Remote Diag is wrong | Set the IP address of the machine remote diagnosis accepting server according to the IP address specification format.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B15      | Port number of Remote Diag is wrong | A value outside the valid setting range may be set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-0B18      | Cannot set because DHCP is available | To set the item, disable the DHCP client function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| E-XXXX      | (No message)                      | Internal error. Report the error number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
The meanings of the error codes indicated in error messages are as follows:

<table>
<thead>
<tr>
<th>Error code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>The available space of the memory card of the Data Server is insufficient.</td>
</tr>
<tr>
<td>10</td>
<td>The specified folder cannot be found.</td>
</tr>
<tr>
<td>11</td>
<td>The allowable number of entries is exceeded.</td>
</tr>
<tr>
<td>12</td>
<td>Access to a folder was rejected.</td>
</tr>
<tr>
<td>14</td>
<td>The specified file cannot be found.</td>
</tr>
<tr>
<td>15</td>
<td>Access to a file was rejected.</td>
</tr>
<tr>
<td>19</td>
<td>An attempt was made to access a file being used.</td>
</tr>
<tr>
<td>22</td>
<td>The specified file name is illegal.</td>
</tr>
<tr>
<td>28</td>
<td>A TV check error was detected.</td>
</tr>
<tr>
<td>36</td>
<td>The specified file is already present.</td>
</tr>
<tr>
<td>37</td>
<td>The folder is not empty.</td>
</tr>
<tr>
<td>39</td>
<td>The specified folder is already present.</td>
</tr>
<tr>
<td>48</td>
<td>The available file size is exceeded.</td>
</tr>
</tbody>
</table>
2.2 ETHERNET CONNECTION CONFIRMATION

By transmitting the PING command, the CNC can check that a connection is made with the communication destination.

PING screen (connection state confirmation)

Procedure

1. Press the function key [SYSTEM].
2. Soft key [ETHER BOARD] is displayed. (If the soft key is not found, press the continuous menu key.)
3. Press soft key [ETHER BOARD] then soft key [PING].
4. Press soft key [(OPRT)] then soft key [PING FTP1] to send the PING command to host 1 to which the Data Server function is connected. Similarly, press soft key [PING FTP2] and soft key [PING FTP3] to send the PING command to connection hosts 2 and 3, respectively.
5 Press soft key [(OPRT)] then soft key [PING RMT1] to send the PING command to inquiry destination 1 of the machine remote diagnosis functions. Similarly, press soft key [PING RMT2] to send the command to inquiry destination 2 and soft key [PING RMT3] to inquiry destination 3.

The results of PING execution are as follows:

![PING results](image)
PING (SETTING) screen

Procedure

1. When sending the PING command to a desired destination, enter the destination address in HOSTNAME (IP ADDRESS) on the PING (SETTING) screen. Moreover, set a desired execution repeat value in REPEAT.

2. After entering a host name (IP address) and repeat value, press soft key [(OPRT)] then soft key [PING EXEC] to send the PING command to the specified destination.

3. To cancel the transmission of the PING command halfway, press soft key [PING CANCEL].
2.3 COMMUNICATION STATE CONFIRMATION

The communication state of the FAST Ethernet/FAST Data Server detected by hardware can be checked.

COM STATE (SEND / RECEIVE) screen

Procedure

1. Press the function key [SYSTEM].
2. Soft key [ETHER BOARD] is displayed. (If the soft key is not found, press the continuous menu key.)
3. Press soft key [ETHER BOARD] then soft key [COM STATE] to display the COM STATE screen.

<table>
<thead>
<tr>
<th>Display item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAUDRATE</td>
<td>Displays the communication rate and mode. Communication rate: 100 Mbps or 10 Mbps Communication mode: Full duplex or Half duplex</td>
</tr>
<tr>
<td>SEND PACKET</td>
<td>Displays the number of sent packets.</td>
</tr>
<tr>
<td>SEND RETRYOVER</td>
<td>Displays the number of errors detected during packet sending.</td>
</tr>
<tr>
<td>COLLISION</td>
<td></td>
</tr>
<tr>
<td>CARRIER SENSE LOST</td>
<td></td>
</tr>
<tr>
<td>NO CARRIER</td>
<td></td>
</tr>
<tr>
<td>FRAME LENGTH ERROR</td>
<td></td>
</tr>
<tr>
<td>RECEIVE PACKET</td>
<td>Displays the number of received packets.</td>
</tr>
<tr>
<td>CRC ERROR</td>
<td></td>
</tr>
<tr>
<td>SHORT FRAME</td>
<td></td>
</tr>
<tr>
<td>LONG FRAME</td>
<td></td>
</tr>
<tr>
<td>ODD FRAME</td>
<td></td>
</tr>
<tr>
<td>OVERFLOW</td>
<td></td>
</tr>
<tr>
<td>PHY-LSI ERROR</td>
<td></td>
</tr>
</tbody>
</table>

COM STATE screen
2.4 COMMUNICATION SOFTWARE CONFIRMATION

The operating status of the software of the FAST Ethernet/FAST Data Server can be checked.

TASK STATE screen

Procedure

1. Press the function key

2. Soft key [ETHER BOARD] is displayed. (If the soft key is not found, press the continuous menu key.)

3. Press soft key [ETHER BOARD] then soft key [TASK STATE] to display the TASK STATE screen.
## Display Item

The meaning of each symbol is indicated below.

<table>
<thead>
<tr>
<th>Symbol and meaning</th>
<th></th>
</tr>
</thead>
</table>
| COMMON             | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | E : Start of software  |
| FOCAS2 #0          | C : Waiting for connection from the host  
                      | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | N : FOCAS2 incapable of being executed  |
| FOCAS2 #1          | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |
| FOCAS2 #2          | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |
| SCREEN             | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |
| UDP                | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |
| PMC                | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |
| DATASERVER         | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |
| FTP SERVER         | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | Number : Number of sockets currently connected  |
| FREMOTE DIAG       | W : Data being processed (1)  
                      | D : Data being processed (2)  
                      | X : Not executed yet  |

When the FOCAS2/Ethernet functions are running, you can check the operating status from:
FOCAS2#0, FOCAS2#1, and FOCAS2#2.

When the CNC screen display functions are running, you can check the operating status from:
SCREEN

When the FANUC LADDER-III functions are running, you can check the operating status from:
PMC

When the Data Server functions are running, you can check the operating status from:
DATASERVER and FTP SERVER

When the Machine Remote Diagnosis functions are running, you can check the operating status from:
REMOTE DIAG
APPENDIX
This appendix describes troubleshooting related to FAST Ethernet/FAST Data Server communication.
A.1 CHECKING COMMUNICATION WITH A HUB

(1) Make sure that the STP cable between the hub and the FAST Ethernet/FAST Data Server is connected.

(2) Make sure that cables are properly wired.
   • Though communication is carried out when the cable pair at the send and receive sides is not properly mounted, communications errors may occur more frequently.

(3) Make sure that a hub for 100BASE-TX is used.
   • A hub for 10BASE-T may be used to perform communication. In this case, however, the communication speed can decrease.

(4) Make sure that the LIL LED on the FAST Ethernet/FAST Data Server is lit at all times.
   • The LIL LED will not light if the FAST Ethernet/FAST Data Server is not connected to the hub or if the hub is not ON.

(5) Make sure that the LED (LINK indicator LED) on the connected hub is lit at all times.
   • Some hubs do not have a LINK indicator LED.
   • The LINK indicator LED will not light if the hub is not connected to the FAST Ethernet/FAST Data Server or the CNC is not ON.

(6) Make sure that a hub for full duplex communication only is not used.
   • The FAST Ethernet/FAST Data Server automatically detects the communication speed and communication mode (full duplex or half duplex) by using the auto negotiation function. In communication with a hub that does not have the auto negotiation function, the FAST Ethernet/FAST Data Server recognizes the communication speed correctly but regards the communication mode as half duplex communication.
     As a result, when an attempt is made to communicate with a hub for full duplex communication only that does not have the auto negotiation function, there is a discrepancy in communication mode, so correct communication cannot sometimes be performed.

   • For details on how to connect, see Part V "CONNECTION."
A.2 CHECKING CONNECTION WITH THE TRUNK

General notes are provided below. For network installation, consult with specialized vendors or manufacturers. Run cables away from noise sources.

The descriptions below are not applicable if the network is configured using only those hubs that have Ethernet boards connected.

- When the trunk is based on 10BASE-5
  1. Make sure that a transceiver is attached to the trunk correctly.
     - If a transceiver is attached correctly, the resistance between the trunk shield and central conductor is about 25 Ω (when a terminating resistor is attached).
     - A special tool is required to attach a transceiver. (No special tool is required, depending on the manufacturer. For details, refer to the installation manual of each transceiver.)
     - Do not attach a transceiver again to a point where a transceiver was once attached. (Otherwise, the cable can be damaged.)
  2. Make sure that transceivers are attached at proper intervals.
     - Transceivers must be attached at intervals of 2.5 m or more. It is recommended that transceivers be attached at intervals of an integral multiple of 2.5 m. Usually, marks indicating installation points are provided on the trunk cable.
  3. Make sure that terminating resistors are attached.
     - A terminating resistor must be attached to each end of the trunk cable. (Resistance: 50 Ω)
  4. Make sure that the trunk cable is not longer than 500 m.
  5. Make sure that the cable (transceiver cable) used for connection between a transceiver and the hub is not longer than a specified limit.
     - Usually, the maximum allowable length of a transceiver cable is 50 m. However, the maximum allowable length of a cable with a smaller diameter may be shorter than 50 m. So, check the specifications of each cable.

- When the trunk is based on 10BASE-2
  1. Make sure that the length of each cable is 0.5 m or more.
     - The minimum allowable distance between nodes (units) is 0.5 m.
  2. Make sure that the trunk cable length (sum of the lengths of cables) is 185 m or less.
  3. Make sure that terminating resistors are attached.
     - A terminating resistor must be attached to each end of the trunk cable. (Resistance: 50 Ω)
A.3 CHECKING SETTINGS

The following describes how to check the minimum settings needed for communications.

NOTE
For details on IP addresses, subnet mask and other set values, consult with the network administrator.

• Checking settings on the FAST Ethernet/FAST Data Server
  (1) Make sure that the MAC address of the FAST Ethernet/FAST Data Server is displayed.
    - This address is appended to each board before shipment from the factory, and is automatically displayed in the Setting screen. This address need not be set by the user.
  (2) Make sure that the IP address is set.
  (3) Make sure that the subnet mask is set.
  (4) When a router is used, make sure that the router IP address is set.

• Checking settings on the personal computer
  (1) Make sure that the IP address is set.
  (2) Make sure that the subnet mask is set.
  (3) When a router is used, make sure that the router IP address is set.

• For details on how to set, see Part III "SETTING."
A.4 CHECKING COMMUNICATION

This section describes how to check the communication status between a CNC and the other communicating partner (host computer). If communication with the CNC sometimes fails or is not possible, first make sure that the communication path is normal by the following procedure. The "ping" command is used to check communication.

In the following example, a host computer running the Windows NT4.0 is used.

- Checking the communication path
  Open the DOS window, and enter 'ping "IP address of CNC"'. If a response is returned from the CNC, the FAST Ethernet/FAST Data Server is connected to the CNC.

1) When a response is returned (normal connection)

   \[\text{Command Output}\]

2) When a response is not returned (abnormal connection)

   \[\text{Command Output}\]

When a response is not returned, probable causes are either the hardware connection or a software setting, or both. Check the hardware connections and software settings again.
• Checking IP addresses for duplication
  IP addresses can be checked for duplication by the procedure described below.
  (1) Disconnect the Ethernet cable from the CNC to isolate it from the network.
  (2) Execute a ping command on another personal computer as described in "• Checking the communication path."
  Since the CNC is disconnected from the network, no response should be returned. If a response is returned, the IP address is in use on another unit. Therefore, the IP address cannot be used on the CNC from which the cable was disconnected.

⚠️ CAUTION
The purpose of this check is to check for a duplicate IP address. It does not assure that the IP address is left non-duplicated because a unit having the same IP address may be turned on after the check or the same address may be set later. When setting an IP addressing, ask the network manager about duplication.

• Checking for influence of electrical noise
  The "ping" command "-t" option is used for checking for the influence of electrical noise. This option sends ping packets until "Ctrl+C" is pressed.
1. About the influence of electrical noise from peripheral machinery (devices)
   (1) Turn the CNC is mounted ON to enable communications.
   (2) Press the EMERGENCY STOP button on the machine with the servo/spindle amplifier OFF, and issue the "ping" command from the host computer.
   (3) Count the number of lost packets (packets for which a response was not returned).
       If a lost packet occurs in this state, the machine is probably being affected by electrical influence from peripheral machines.
       **Countermeasure:**
       Pin-point the source of the electrical noise, and check the wiring again to prevent the influence of electrical noise.

2. About the influence of electrical noise from mounted machinery
   (1) Start up the machine in the same way as 1 above.
   (2) Cancel the emergency stop on the machine with the servo/spindle amplifier ON, and issue the "ping" command from the host computer.
   (3) Count the number of lost packets.
       If more lost packets than in 1 above are occurring, a probable cause is the influence of electrical noise on the machine itself. General probable causes are the state of the ground on the machine or on the communicating party.
       **Countermeasure:**
       Check the state of the ground on the machine or on the communicating party, and insulate the communications trunk with the machine.

- For the method of checking the operating status and communication status of the FAST Ethernet/FAST Data Server, see Part VI “MAINTENANCE” as well.
This appendix describes the method of setting up an FTP server that operates on the host computer to function as a communication destination for the Data Server functions.
B.1 SETTING UP FTP SERVER OF Windows 2000 Professional (FOR INTERNET INFORMATION SERVICE)

Installing the Internet Information Service


2. Click [Install Add-On Components].
3. Select [Internet Information Services (IIS)], then click the [Details] button to display the [Internet Information Services (IIS)] dialog box. Next, check [File Transfer Protocol (FTP) Server].

4. Click the [OK] button, then return to the previous screen. Next, click [Next]. The necessary files are installed. The installation is completed when the following screen appears:
Setting the Internet Information Service

1. Select [Start] → [Settings] → [Control Panel].

2. Double-click [Administrative Tools].
3. Double-click [Internet Service Manager] for activation.

4. Double-click the computer name. Next, select [Default FTP Site] and right-click to display the menu. Then, select Properties.
5. Select the [Home Directory] tab to display the [Home Directory] property sheet. Check [Read] and [Write] in [FTP Site Directory]. In [Directory Listing Style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.

6. Upon completion of setting, click the [Apply] button. In [Default FTP Site], the directory named "\Inetpub\ftproot", set in [Local Path] above (in the drive where Windows 2000 is installed), is assumed to be the home directory. So, directories under this directory can be accessed. So, with the default setting, NC programs need to be managed under this directory.

The home directory can be changed by setting the new directory in the [Local Path] of [FTP Site Directory].

7. To access a directory other than the directories under the home directory, a virtual directory needs to be set. For details of a virtual directory, use the online help information of Windows 2000.
Login user setting

1. Select [Start] → [Settings] → [Control Panel].

   ![Control Panel](image)

2. Double-click the icon [Users and Passwords].

   ![Users and Passwords](image)
3. Click the [Add] button, then enter necessary items such as a user name.

4. Click the [Next] button, then enter a password for the specified user name. (Unless a password is set, access to the FTP server cannot be made correctly. So, be sure to enter a password.)
5. Click the [Next] button, then set an access right to be granted. The access right set here can affect the capability to read from and write to a file in FTP-based communication. Use care when setting an access right.

![Add New User dialog box]

6. Click the [Finish] button. The entered user name is registered, and the user can log in by using the user name and password.
Stopping password expiration for a login user

If the password expiration is not stopped, when the password expires, login is disabled, preventing FTP communication. Therefore, stop the password expiration as necessary. When a password has expired, it is necessary to set the password again.

1. Select [Start] → [Settings] → [Control Panel].
2. Double-click the icon [Users and Passwords].

3. Click the [Advanced] tab.
4. Click the [Advanced] button.

5. Double-click [Users]. A list of registered users is displayed.
6. Double-click the user name for which you want to change the password setting. For example, double-click "dtsvr".

7. Check [Password never expires] and then click the [OK] button. The password expiration is stopped.
B.2 SETTING UP FTP SERVER OF Windows XP Professional (FOR INTERNET INFORMATION SERVICE)

NOTE
Windows XP Home Edition does not have IIS (Internet Information Service).

Installing the Internet Information Service


2. Double-click [Add or Remove Programs].
3. Double-click [Add/Remove Windows Components].

![Windows Components Wizard]

To add or remove a component, click the checkbox. A checked box means that only part of the component will be installed. To see what's included in a component, click Details.

- Internet Service
- Internet Explorer
- Internet Information Services (IIS)
- Management and Monitoring Tools
- Message法定

Description: Includes Web and FTP support, along with support for FrontPage, transactions, Active Server Pages, and database connections.

Total disk space required: 15.9 MB
Space available on disk: 3963.6 MB

4. Select [Internet Information Services (IIS)], then click the [Details] button to display the [Internet Information Services (IIS)] dialog box. Next, check [File Transfer Protocol (FTP) Service].

![Internet Information Services (IIS)]

To add or remove a component, click the checkbox. A checked box means that only part of the component will be installed. To see what's included in a component, click Details.

- Common Files
- Documentation
- File Transfer Protocol (FTP) Service
- FrontPage 2000 Server Extensions
- Internet Information Services SnapIn
- SMTP Service
- World Wide Web Service

Description: Provides support to create FTP sites used to upload and download files.

Total disk space required: 1.3 MB
Space available on disk: 3963.5 MB
5. Click the [OK] button, then return to the previous screen. Next, click [Next].

6. The dialog box above is displayed, and the necessary files are installed.

7. The installation is completed when the screen above is displayed.
Setting the Internet Information Service


2. Click [Performance and Maintenance].
3. Click [Administrative Tools].

4. Double-click [Internet Information Services].
5. Double-click [FTP Site], right-click [Default FTP Site] to display a menu, then select Properties.

6. Select the [Home Directory] tab to display the [Home Directory] property sheet. Check [Read] and [Write] in [FTP Site Directory]. In [Directory Listing Style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.
7. Then, click the [OK] button.
In the standard [Default FTP Site], the directory \Inetput\ftproot (on the drive where Windows XP is installed) is the home directory, and only the directories under the home directory can be accessed.

To use a directory other than the default directory as a home directory, modify the local path of [FTP Site Directory] mentioned in step 6 above.

8. To access a directory other than the directories under the home directory set in step 7 above, a virtual directory needs to be set.
For details of a virtual directory, use information such as the online help information of Windows XP.
Login user setting


2. Double-click the icon of [User Accounts].
3. Click [Create a new account], then enter a desired user name.

4. Click the [Next] button, then set an account type. The access right set here can affect the capability to read from and write to a file in FTP-based communication. Use care when setting an access right.
5. Click the [Create Account] button, then the creation of an account is completed.

6. For password setting, click the previously created account in [or pick an account to change]. (The FTP server cannot be accessed without setting a password. So, be sure to execute this step.)
7. Click [Create a password], then enter a password for the specified user name.

![Create a password for dtsvr's account](image)

8. Click the [Create Password] button to register the entered password. By using the account registered this time, the user can log in to the FTP server.
Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password.
If you are necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

1. Select [Start] → [All Programs] → [Accessories] → [Command Prompt].

2. Input “net user login-user /expires:never”.

3. If the above message is displayed, the password expiration is stopped.
Confirming the Firewall function of Windows XP

Because the Internet Connection Firewall function is included in the Windows XP Professional, the Data Server cannot communicate with the FTP server. If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

**NOTE**
When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled. Therefore, when making the following settings, consult with your network administrator, and take special care. In some cases, it becomes necessary to isolate the network from the outside as required.

2. Click the icon of [Network and Internet Connections].

3. Click the icon [Network Connections].
4. Right-click the icon [Local Area Connection] to display the menu. Then, select Properties.

5. Select the [Advanced] tab.
6. If [Internet Connection Firewall] is not checked, the Internet Connection Firewall function does not work. Then, the following confirmations are not necessary.

7. If [Internet Connection Firewall] is checked, click the [Settings…] button.

8. If the [FTP Server] check-box is not checked, the FTP server function does not work. Check the [FTP Server] check-box. When the [FTP Server] check-box is checked, the following window is displayed. Then, click the [OK] button.
10. If the [Allow incoming echo request] check-box is not checked, the Data Server function cannot find the FTP server at the start of communication. At the start of communication of Data Server, if the message “[FTP] (IP-address) IS NOT AVAILABLE” is displayed, check this check-box.
Confirming the firewall function when Windows XP (Service Pack 2) is used

When Windows XP Professional (Service Pack 2) is used, a different firewall setting procedure is used.


2. Double-click [Security Center] to start it.
3. Click [Windows Firewall] displayed at the bottom.
5. Click the [Settings] button of [ICMP].

![ICMP Settings window](image)

Internet Control Message Protocol (ICMP) allows the computers on a network to share error and status information. Select the requests for information from the Internet that this computer will respond to:

- [ ] Allow incoming echo request
- [ ] Allow incoming timestamp request
- [ ] Allow incoming mask request
- [ ] Allow incoming router request
- [ ] Allow outgoing destination unreachable
- [ ] Allow outgoing source quench
- [ ] Allow outgoing parameter problem
- [ ] Allow outgoing time exceeded
- [ ] Allow indirect
- [ ] Allow outgoing packet too big

Description:

Messages sent to this computer will be repeated back to the sender. This is commonly used for troubleshooting—for example, to ping a machine. Requests of this type are automatically allowed if TCP port 445 is enabled.

[OK] [Cancel]

6. If [Allow incoming echo request] is not checked, check it, and click the [OK] button.
   This allows a response to be made to PING from other devices.
7. Select the [Exceptions] tab.

![Windows Firewall Exceptions](image)

- Windows Firewall is blocking incoming network connections, except for the programs and services selected below. Adding exceptions allows some programs to work better but might increase your security risk.
- Programs and Services:
  - File and Printer Sharing
  - Remote Assistance
  - Remote Desktop
  - IPRF Framework

- Display a notification when Windows Firewall blocks a program

What are the risks of allowing exceptions?

OK  Cancel

8. Click the [Add Port] button, and make settings as follows:

![Add a Port](image)

- Use these settings to open a port through Windows Firewall. To find the port number and protocol, consult the documentation for the program or service you want to use.
- Name: FTP Server
- Port number: 21
- Protocol: TCP

What are the risks of opening a port?

Change scope...  OK  Cancel
9. Click the [OK] button.
This appendix describes the method of setting up the DNS/DHCP server of Windows 2000 Server.

Example of setting a simple network

An example of setup in a network configuration that satisfies the following conditions is provided:
1. The DHCP server and DNS server are operated using the same personal computer.
2. The IP address of the DHCP server and DNS server is 192.168.0.254.
3. The DHCP server controls the IP address range 192.168.0.10 to 192.168.0.29.
4. The domain controlled by the DNS server is named "factory".
5. The same domain includes the DHCP server, DNS server, CNCs, and a PC for FOCAS1/Ethernet applications.

NOTE
The setting described above is just an example. For setup in an actual network configuration in the factory, consult with the network administrator of the factory.
C.1 EXAMPLE OF SETTING UP DHCP SERVER OF Windows 2000 Server

1. Activating the Microsoft administrative console (DHCP)

   Click [Programs] → [Administrative Tools] → [DHCP].

2. Adding a scope

   Click [Action] → [New Scope] to start “New Scope Wizard”.

   Click the [Next] button.
Enter "factory" as [Name], and enter "FACTORY" as [Description].

Enter "192.168.0.10" as [Start IP address], enter "192.168.0.29" as [End IP address], enter "24" as [Length], and enter "255.255.255.0" as [Subnet mask].

Click the [Next] button.
Click the [Next] button without entering any data.

Keep "8" days unchanged as Period, then click the [Next] button.

Keep [Yes, I want to configure these options now] selected, and click the [Next] button.
Click the [Next] button without entering any data.

Enter “192.168.0.254” as IP Address, then click [Add].

Click the [Next] button.

Click the [Next] button without entering any data.
Keep [Yes, I want to activate this scope now] selected, and click the [Next] button.

Click [Finish].
3. Adding a scope option

Click [Scope[192.168.0.0]factory], then click [Scope Options] → [Action] → [Configure Options].

From the available options, find and check [DNS Domain Name]. Then, enter "factory" as String value.

Click the [OK] button.

The following setting is made:
4. Enabling Dynamic DNS

Click [Scope [192.168.0.0] factory] → [Properties] → [DNS].

Check [Always update DNC] and [Enable updates for DNS clients that do not support dynamic update].

Click the [OK] button.

This completes DHCP server setting.
C.2 EXAMPLE OF SETTING UP DNS SERVER OF Windows 2000 Server

1. Activating the Microsoft administrative console (DNS)

Click [Programs] → [Administrative Tools] → [DNS].

2. DNS server configuration

Click [Action] → [Configure the server] to start [Configure DNS Server Wizard].

Click the [Next] button.
Keep [This is the first DNS server on this network] selected, and click the [Next] button.

Keep [Yes, create a forward lookup zone], and click the [Next] button.

Keep [Standard primary] selected, and click the [Next] button.
Enter "factory." as Name. (Do not fail to enter "." after "factory").

Click the [Next] button.

Keep "factory.dns" unchanged, and click the [Next] button.

Keep [Yes, create a reverse lookup zone] selected, and click the [Next] button.
Keep [Standard primary] selected, and click the [Next] button.

Enter “192.168.0” as Network ID.

Click the [Next] button.

Keep “0.168.192.in-addr.arpa.dns” unchanged, and click the [Next] button.
Click the [Finish] button.
3. Enabling Dynamic DNS

Right-click [Forward Lookup Zones] → [factory].

Click [Properties].

For [Allow dynamic updates?], select [Yes].

Click the [OK] button.

This completes DNS server setting.
FTP CLIENT OPERATION

This appendix describes the method of operating an FTP client that operates on the host computer to function as a communication destination for the Data Server functions.
D.1 OPERATION USING THE FTP COMMAND

Login

1. Enter "ftp IP-address-of-NC or host-name" at the command prompt.
2. Enter a user name.
3. Enter a password.
4. The message, "230 User logged in, proceed." indicates that the login process has been completed successfully.

GET (acquiring a file from the FTP server)

1. Enter "get hard-disk-file-name."

MGET (acquiring files from the FTP server)

1. Enter "mget hard-disk-file-name (including a wildcard character)."
PUT (sending a file to the FTP server)

Enter "put host-file-name hard-disk-file-name."

```
ftp> put 00001,DAT 00001
200 Command okay.
150 Opening data connection for (00001) (192.168.0.101,1097).
226 Closing data connection.
1040102 bytes sent in 11.48 seconds (90.69 Kbytes/sec).
ftp>
```

MPUT (sending files to the FTP server)

Enter "mput host-file-name (including a wildcard character)."

```
ftp> mput *.*.DAT
200 Command okay.
150 Opening data connection for (00002,DAT) (192.168.0.101,1098).
226 Closing data connection.
2090120 bytes sent in 22.89 seconds (83.86 Kbytes/sec).
200 Command okay.
150 Opening data connection for (PRG7,DAT) (192.168.0.101,1099).
226 Closing data connection.
1160 bytes sent in 0.00 seconds (1160000.00 Kbytes/sec).
ftp>
```

DIR (acquiring a list of files of the FTP server)

Enter dir.

```
ftp> dir
200 Command okay.
150 Opening data connection for (LIST ) (192.168.0.101,1095).
  d----- 1 owner group 0 Feb 10 19:42 ...
  d----- 1 owner group 0 Feb 10 19:42 ...
  d----- 1 owner group 1840102 Feb 16 06:47 00001,DAT
  d----- 1 owner group 2080120 Feb 16 09:47 00002,DAT
  d----- 1 owner group 454448 Feb 24 16:57 PRMETER
  d----- 1 owner group 171902 Feb 24 17:02 TOLIFS
  d----- 1 owner group 4116 Feb 25 10:35 MICRO
  d----- 1 owner group 74 Feb 19 08:47 00189,PAG
  d----- 1 owner group 12202 Feb 12 17:00 PITCH
  d----- 1 owner group 2740 Feb 24 17:54 NEXOFS
  d----- 1 owner group 482 Feb 24 18:28 HISTORY
  d----- 1 owner group 6004 Feb 24 20:31 MCODE
  d----- 1 owner group 1160 Feb 16 08:46 PRG7,DAT
226 Closing data connection.
376 bytes received in 0.17 seconds (5.15 Kbytes/sec).
ftp>
```

DEL (deleting a file from the FTP server)

Enter "del hard-disk-file-name."

```
ftp> del 00001,DAT
250 Requested file action okay, completed.
ftp>
```
TYPE (confirming the transfer type of the FTP client)

1. Enter type.
2. Whether the ascii mode or binary mode is set can be determined.

```
ftp> type
Using ascii mode to transfer files.
```

```
ftp> type
Using binary mode to transfer files.
```

ASCII, BIN (changing the transfer type of the FTP client)

1. Entering bin can change the mode to the binary mode.

```
ftp> bin
200 Type set to I.
```

2. Entering ascii can change the mode to the ascii mode.

```
ftp> ascii
200 Type set to A.
```

Logout

1. Enter bye.

```
ftp> bye
221 Service closing control connection.
```

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D.2 SECURITY UNBLOCKING IN Windows XP (Service Pack 2)

When an attempt is made to start FTP communication for the first time in Windows XP (Service Pack 2), the security alert shown below may appear. If the alert appears, consult with the network administrator, and select "Unblock" as necessary.

⚠️ CAUTION
Since selecting "Unblock" means change in settings related to network security, be sure to consult with the network administrator in advance. If "Unblock" is selected carelessly, network security can be compromised.
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## Revision Record

**FANUC FAST Ethernet / FAST Data Server For FANUC Series 30i/300i, 31i/310i, 32i/320i-MODEL A**  
**OPERATOR’S MANUAL (B-64014EN)**

<table>
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<th>Edition</th>
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| 03      | Aug., 2005 | • Addition of such as NC program input/output on the Data Server functions  
|         |            | • Correction of errors                                                     |
| 02      | Sep., 2004 | • Addition of the machine remote diagnosis function                        |
|         |            | • Addition of the Series 31i/310i-A, 32i/320i-A                            |
|         |            | • Correction of errors                                                     |
| 01      | Sep., 2003 |                                                                          |